

ONTARIO MINISTRY OF ENVIRONMENT



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# SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAM

1979 Sampling Results for Lakes in the Central  
Region of the Ministry of the Environment

Ministry  
of the  
Environment

Central  
Region

Suite 700  
150 Ferrand Drive  
Don Mills, Ontario  
M3C 3C3  
(416) 424-3000

- 1) Allen Lake, Dudley & Harcourt Townships, Haliburton
- 2) Balsam Lake, Bexley Township, Victoria County
- 3) Bass Lake, Orillia & Oro Townships, Simcoe County
- 4) Beech Lake, Stanhope Township, Haliburton
- 5) Belmont Lake, Belmont & Methuen Township, Peterborough
- 6) Big Barnhum Lake, Dudley Township, Haliburton
- 7) Big Hawk Lake, Stanhope Township, Haliburton
- 8) Big Straggle Lake, Harcourt Township, Haliburton
- 9) Billings Lake, Glamorgan Township, Haliburton
- 10) Birch Bark (Trounce) Lake, Galway-Cavendish Township, Peterborough
- 11) Black Lake, Township of Muskoka Lakes, Muskoka
- 12) Blue Hawk Lake, Dysart Township, Haliburton
- 13) Boshkung Lake, Stanhope Township, Haliburton
- 14) Bruce Lake, Township of Muskoka Lakes, Muskoka
- 15) Canning Lake, Minden & Snowdon Townships, Haliburton
- 16) Catchacoma Lake, Cavendish Township, Peterborough
- 17) Clear Lake, Oakley Ward, Town of Bracebridge, Muskoka
- 18) Clearwater Lake, Town of Gravenhurst, Muskoka
- 19) Chandos Lake, Chandos Township, Peterborough
- 20) Cordova Lake, Belmont Township, Peterborough
- 21) Crego Lake, Somerville Township, Victoria
- 22) Crystal Lake, Galway Township, Peterborough
- 23) Doeskin Lake, Town of Gravenhurst, Muskoka
- 24) Drag Lake, Dudley & Dysart Township, Haliburton
- 25) Dummer Lake, Dummer Township, Peterborough
- 26) East Lake, Harcourt Township, Haliburton
- 27) Fairy Lake, Town of Huntsville, Muskoka
- 28) Farlain Lake, Tiny Township, County of Simcoe
- 29) George's Lake, Harcourt Township, Haliburton
- 30) Gibson Lake, Georgian Bay Township, Muskoka
- 31) Go Home Lake, Township of Georgian Bay, Muskoka
- 32) Gull Lake, Lutterworth Township, Haliburton
- 33) Haliburton Lake, Harburn Township, Haliburton
- 34) Halls Lake, Stanhope Township, Haliburton
- 35) Harp Lake, Town of Huntsville, Muskoka
- 36) Head Lake, Laxton & Digby Townships, Victoria
- 37) Jack Lake, Burleigh & Methuen Township, Peterborough
- 38) Kahshe Lake, Town of Gravenhurst, Muskoka
- 39) Kashagawigamog Lake, Dysart & Minden Township, Haliburton
- 40) Kawagama Lake, Haliburton
- 41) Kennaway Lake, Harcourt Township, Haliburton
- 42) Koshlong Lake, Glamorgan Township, Haliburton
- 43) Lake of Bays, Township of Lake of Bays, Muskoka
- 44) Lake Joseph, Township of Muskoka Lakes, Muskoka
- 45) Lake St. John, Rama Township, Simcoe
- 46) Lake Vernon, Town of Huntsville, Muskoka
- 47) Leech Lake, Town of Bracebridge, Muskoka
- 48) Leonard Lake, Township of Muskoka Lakes, Muskoka
- 49) Little Hawk Lake, Stanhope Township, Haliburton
- 50) Little Kennisis Lake, Havelock Township, Haliburton

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- 52) Long Lake, Dudley Township, Haliburton
- 53) Long Lake, Monmouth Township, Haliburton
- 54) Loon Lake, Township of Dysart, Haliburton
- 55) Looncall Lake, Burleigh Township, County of Peterborough
- 56) Mary Lake, Town of Huntsville, Muskoka
- 57) Medora Lake, Township of Muskoka Lakes, Muskoka
- 58) Miskwabi Lake, Dudley Township, Haliburton
- 59) Morrison Lake, Town of Gravenhurst, Muskoka
- 60) Mountain Lake, Minden Township, Haliburton
- 61) Muldrew Lake, Town of Gravenhurst, Muskoka
- 62) Muskoka Bay, Town of Gravenhurst, Muskoka
- 63) Nine Mile Lake, Muskoka Lake Township, Muskoka
- 64) Orr Lake, Flos Township, County of Simcoe
- 65) Percy Lake, Harburn Township, Haliburton
- 66) Pine Lake, Town of Bracebridge, Muskoka
- 67) Pine Lake, Town of Gravenhurst, Muskoka
- 68) Ril Lake, Township of Lake of Bays, Muskoka
- 69) Round Lake, Belmont Township, County of Peterborough
- 70) Salerno Lake, Snowdon & Glamorgan Townships, Haliburton
- 71) Shadow Lake, Somerville Township, Victoria
- 72) Six Mile Lake, Township of Georgian Bay, Muskoka
- 73) Soyers Lake, Minden Township, Haliburton
- 74) Stony Lake, Dummer Township, Peterborough
- 75) Stormy Lake, Glamorgan Township, Haliburton
- 76) Sunny Lake, Town of Gravenhurst, Muskoka
- 77) Tallan Lake, Chandos Township, County of Peterborough
- 78) Twelve Mile Lake, Minden Township, Haliburton
- 79) Walker's Lake, Lake of Bays Township, Muskoka
- 80) Waseosa Lake, Town of Huntsville, Muskoka
- 81) Wenona Lake, Dudley Township, Haliburton
- 82) Wood Lake, Oakley Ward, Town of Bracebridge, Muskoka

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

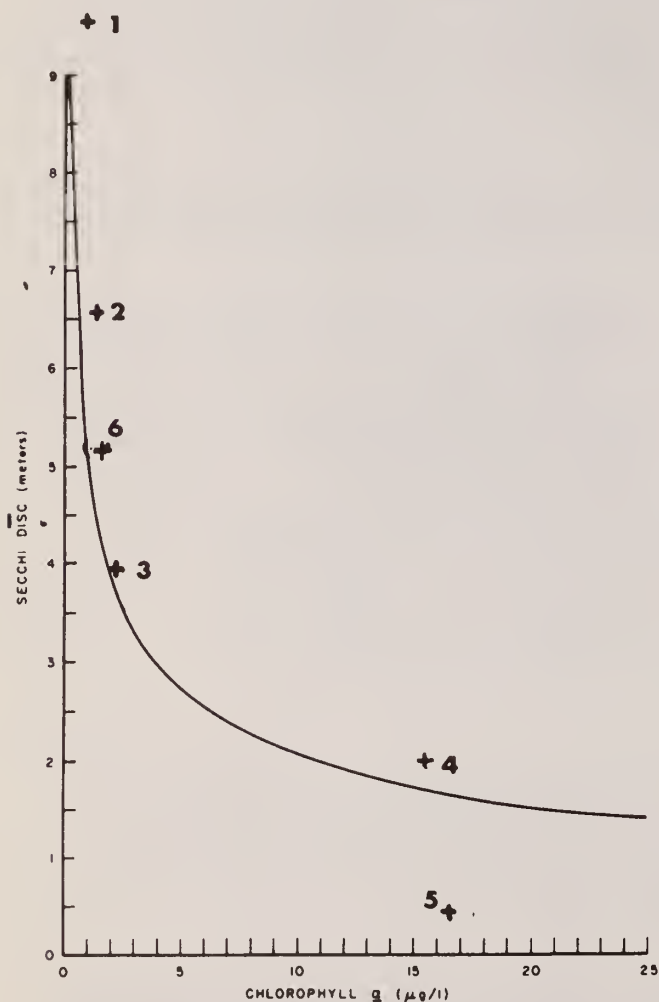
Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Allen Lake.

Date	Stn.	Main S.D.	Chloro. <u>a</u>
May 21	5.5	2.1	Secchi disc readings varied from 4.3 to 6.0 metres over the period sampled, with the lowest measurements of water transparency occurring during late July and the first half of August. The chlorophyll <u>a</u> concentration ranged from 1.1 to 2.4 ug/L.
June 3	5.0	1.6	
June 10	5.75	1.2	
June 17	5.5	1.6	
June 24	6.0	1.1	
July 2	6.0	1.3	Based on the seasonal means for these two parameters, Allen Lake would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae.
July 8	5.5	2.4	
July 15	5.0	2.4	
July 22	5.0	2.1	
July 29	4.5	2.4	
Aug. 6	4.75	1.5	
Aug. 12	4.3	1.9	
Aug. 19	5.0	1.9	
Aug. 26	5.5	2.2	
Sept. 3	5.0	-	
Mean	<u>5.2</u>	<u>1.8</u>	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Allen Lake from 1973 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973	4.7	1.3
1974	4.9	1.2
1975	5.6	1.8
1976	5.3	1.8
1977	5.6	- -
1978	5.3	1.6
1979	5.2	1.8
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Allen Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Allen Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

During the last five years, the seasonal mean Secchi disc reading has varied between 5.2 to 5.6 metres, and the chlorophyll a concentration has varied from 1.6 to 1.8 ug/L. This minimal degree of variation is indicative of a stable lake condition. Continued participation in this program is recommended, in order to determine if this condition persists.

For additional copies of this report, please contact:

Ontario Ministry of the Environment, Central Region, 150 Ferrand Drive, Don Mills, Ontario, M3C 3C3 (416) 424-3000, Att'n. Mr. Dhan Sharma



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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Balsam Lake.

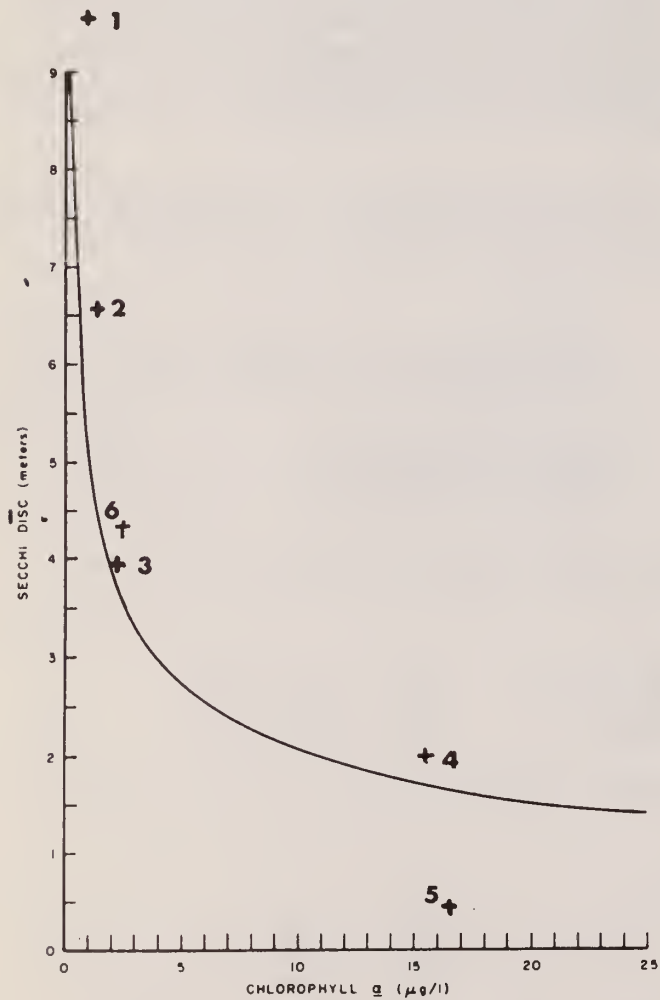
Date	Stn. S.D.	North Bay (South) Chloro. <u>a</u>	Stn. S.D.	North Bay Chloro. <u>a</u>	Stn. S.D.	South Bay Chloro. <u>a</u>
July 2	4.25	3.8	4.25	3.8		
July 8	4.5	2.0				
July 15	4.6	2.4				
July 22	4.5	- -	4.5	2.3		
July 29	4.5	0.6			2.7	3.9
Aug. 6	- -	- -	- -	- -	4.6	3.0
Aug. 12	4.0	1.5			- -	- -
Aug. 17					3.7	2.5
Aug. 19	4.0	3.3				
Mean	4.3	2.3				

Very little fluctuation in Secchi disc readings and minor fluctuations in chlorophyll a concentrations were noted through the sampling period at the North Bay station. Insufficient samples were taken at the other two locations to allow meaningful conclusions about the enrichment status of the lake at these points.

Based on the results for North Bay (South) the lake was considered moderately enriched with moderate algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Balsam Lake in 1977 and 1979.

Year	Stn. South Bay		Stn. North Bay	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976				
1977	2.9	- -		
1978	2.6	2.3		
1979	- -	- -	4.3	2.3
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Balsam Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Balsam Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Continued sampling, especially in South Bay is encouraged to define long term trends in the enrichment status of Balsam Lake.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

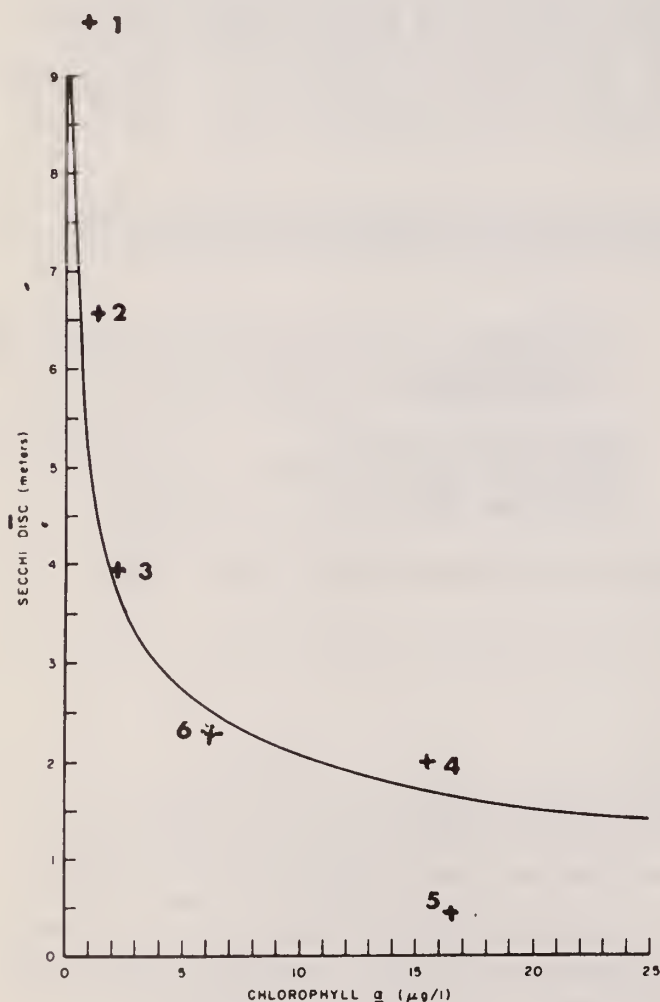
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Bass Lake

Date	Stn.	Main	
	S.D.	Chloro. <u>a</u>	
May 24	3.5	2.9	The Secchi disc readings varied from 1.5 to 3.5 metres. The highest measurements of water transparency occurred in late May and early June and then declined through the remainder of the sampling period. The lowest measurements of water transparency were taken in September and the beginning of October, coinciding with the highest densities of suspended algae. The Chlorophyll <u>a</u> densities during this period indicate that the lake was probably experiencing a minor algal bloom.
June 5	3.0	5.5	
June 18	3.0	4.7	
July 3	2.1	7.5	
July 29	2.4	3.8	
Aug. 20	2.3	3.5	
Sept. 5	1.5	9.1	
Sept. 16	1.5	9.3	
Oct. 1	1.5	9.0	
Mean	2.3	6.1	Based on the seasonal means for the two parameters monitored, Bass Lake would be considered enriched; characterized by poor water transparency and high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Bass Lake 1973 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973	2.2	2.6
1974	2.0	2.4 (1.6m, 6.4 ug/L)*
1975	1.9	6.5
1976	2.0	4.8
1977	2.1	- -
1978	1.8	6.7
1979	2.3	6.1
"		

MOE data



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Bass Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Bass Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Since 1975 the variations in the Secchi disc readings have been minor, and the chlorophyll a concentrations have remained within the range expected for shallow enriched lakes. Based on these data the condition of Bass Lake appears stable. Continued participation in this program is recommended, to determine if this trend continues.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

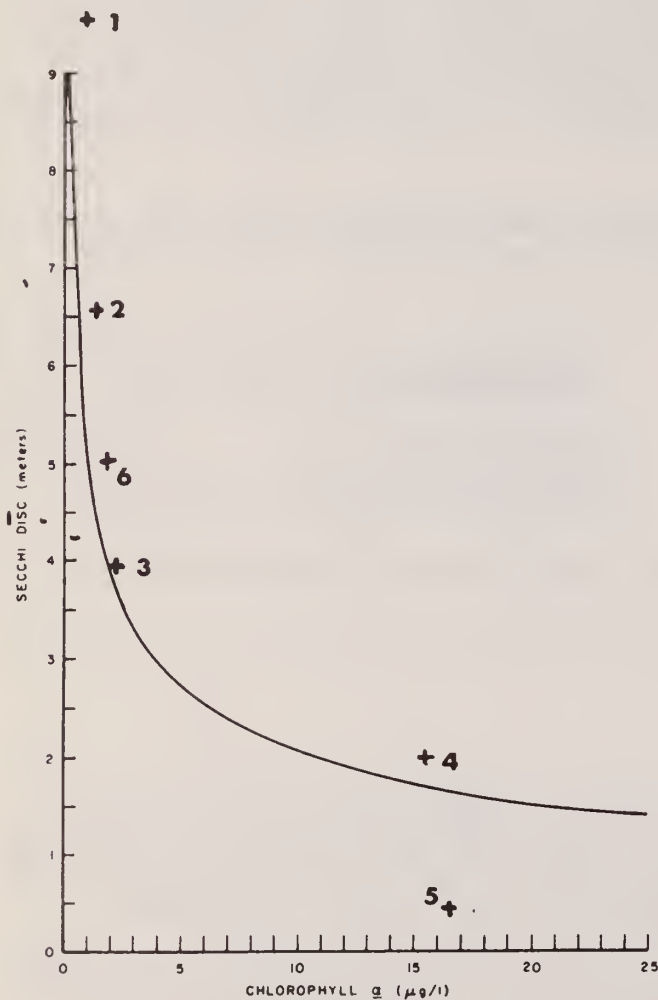
Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from BEECH LAKE

Date	Stn.	Main	
	S.D.	Chloro. <u>a</u>	
May 22	5.5	1.3	The Secchi disc readings varied from 4.75 to 6.0 metres, and the chlorophyll <u>a</u> concentrations ranged from 1.3 to 2.2 ug/L over the period sampled. No trends are apparent in the variations experienced by either of these parameters.
July 8	4.75	2.2	
July 29	4.5	2.1	
Aug. 6	4.0	2.1	
Aug. 19	6.0	1.7	Based on the seasonal means of these parameters, Beech Lake would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae.
Mean	5.0	1.9	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Beech Lake from 1976 to 1979.

	Stn.	
Year	S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976	5.3	1.9
1977	5.3	- -
1978	4.8	1.5
1979	5.0	1.9
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Beech Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Beech Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

During the last four years, the seasonal mean Secchi disc has varied between 4.8 and 5.3 metres, and the chlorophyll a concentration has varied from 1.5 to 1.9 ug/L. This minimal degree of variation is indicative of a stable lake condition. Continued participation in this program is recommended, in order to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Belmont Lake.

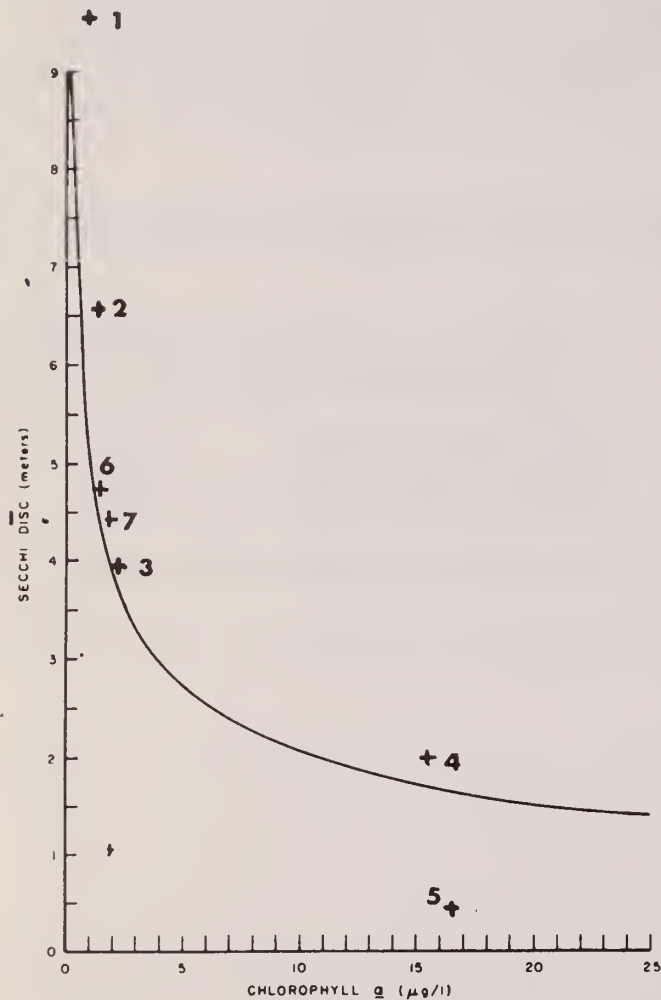
Date	Stn. S.D.	Main Chloro. <u>a</u>
May 30	4.0	0.9
June 12	4.0	0.8
June 27	4.0	2.1
July 3	4.0	2.1
July 9	4.5	1.6
July 16	5.0	1.6
July 31	5.5	0.6
Aug. 6	4.5	1.9
Aug. 13	6.0	2.2
Aug. 21	5.5	1.3
Aug. 28	5.0	2.1
Sept. 10	4.5	2.5
Mean	4.7	1.6

An excellent sampling program was undertaken on the lake during 1979. Very little fluctuation in the Secchi disc readings and chlorophyll a concentrations was noted during the sampling period. Based on the average values of these parameters the lake bordered unenriched conditions with low algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Belmont Lake from 1972 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972	3.7	1.3
1973	- -	- -
1974	4.3	1.2
1975	4.0	2.2
1976	4.1	1.8
1977	5.3	- -
1978	4.8	1.6
1979	4.7	1.6
1978*	4.1	2.0

\* Mean values from MOE/7 links Water Quality Survey 1978.



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Belmont Lake - 1979
7. Belmont Lake average 1972 to 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Belmont Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

There is no apparent trend in the year to year variation in values presented in Table 2. The average of Table 2 values between 1972 and 1979 is also plotted in Figure 1 showing that the 1979 average values were very close to the longer term average enrichment status. Continued participation in the sampling program is encouraged to refine the long term average position of the lake enrichment status and to determine long-term trends.

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Ontario

BIG BARNHUM LAKE  
Dudley Township  
Provisional County of Haliburton

Ministry  
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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.)  
(metres - m)

Chlorophyll a concentrations (Chloro. a)  
(micrograms per litre - ug/l)

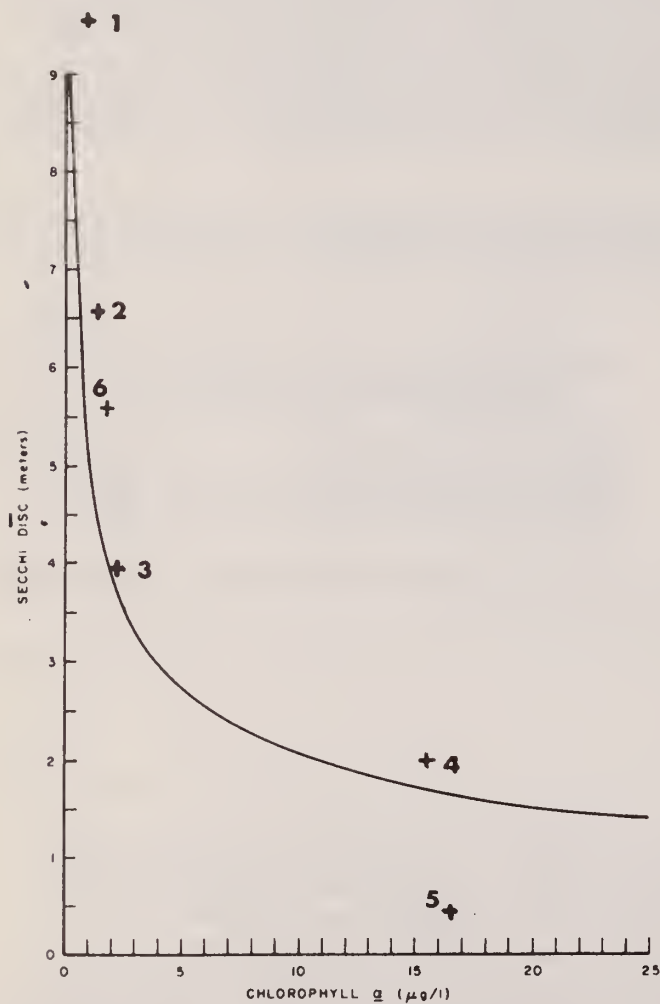
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Big Barnhum Lake.

Date	Stn.	Main	
	S.D.	Chloro. <u>a</u>	
May 21	5.5	3.9	
" 27	5.0	1.0	The Secchi disc readings varied considerably during May and June, and then remained constant during the remainder of the sampling period. Similarly the greatest variations in the chlorophyll <u>a</u> concentration occurred during May and June.
June 3	7.6	1.1	
" 10	9.1	0.9	
" 17	6.1	2.0	
" 24	6.1	1.7	
July 2	5.0	2.2	Based on the seasonal mean for the two parameters monitored, Big Barnhum Lake would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae.
" 8	5.0	2.3	
" 22	5.0	2.4	
" 29	5.0	2.6	
Aug. 6	5.0	2.4	
" 12	5.0	1.9	
" 19	5.0	1.7	
" 26	5.0	1.8	
Sept. 3	5.0	2.0	
Mean	5.6	2.0	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Big Barnhum Lake from 1975 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975	5.5	1.6
1976	4.7	4.0
1977	6.0	- -
1978	5.9	1.4
1979	5.6	2.0
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Big Barnhum Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Big Barnhum Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Since 1977, the seasonal mean Secchi disc reading and chlorophyll a concentration have experienced only minor variations, indicating a stable lake condition. Continued participation in this program is recommended, to determine if this trend continues.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

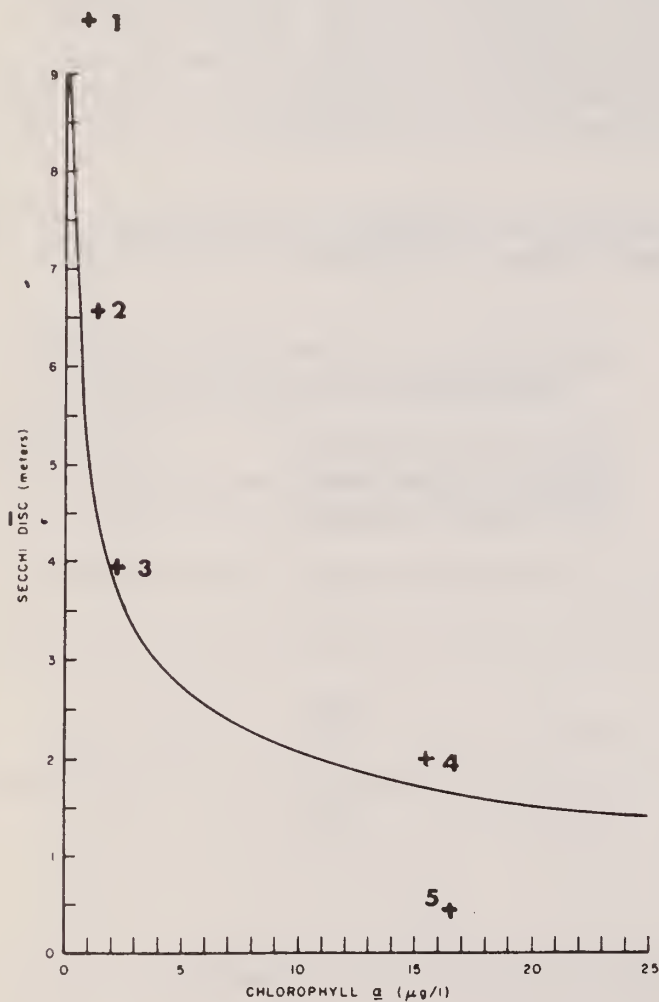
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Big Hawk Lake.

Date	Stn. S.D.	1 Chloro. <u>a</u>	Stn. S.D.	2 Chloro <u>a</u>	Stn S.D.	3 Chloro <u>a</u>
Aug. 12	9.0	1.7	9.5	3.8	5.0	1.1

Insufficient data was collected to allow a meaningful conclusion to be reached.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from 1972 to 1977.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972	6.3	0.8
1973	7.2	1.0
1974	6.9	0.7
1975	7.0	1.2
1976	6.8	1.1
1977	7.7	- -
1978	- -	- -
1979	- -	- -
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Big Hawk Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Big Hawk Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is continued, an increased sampling frequency is required, in order that meaningful data may be obtained.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

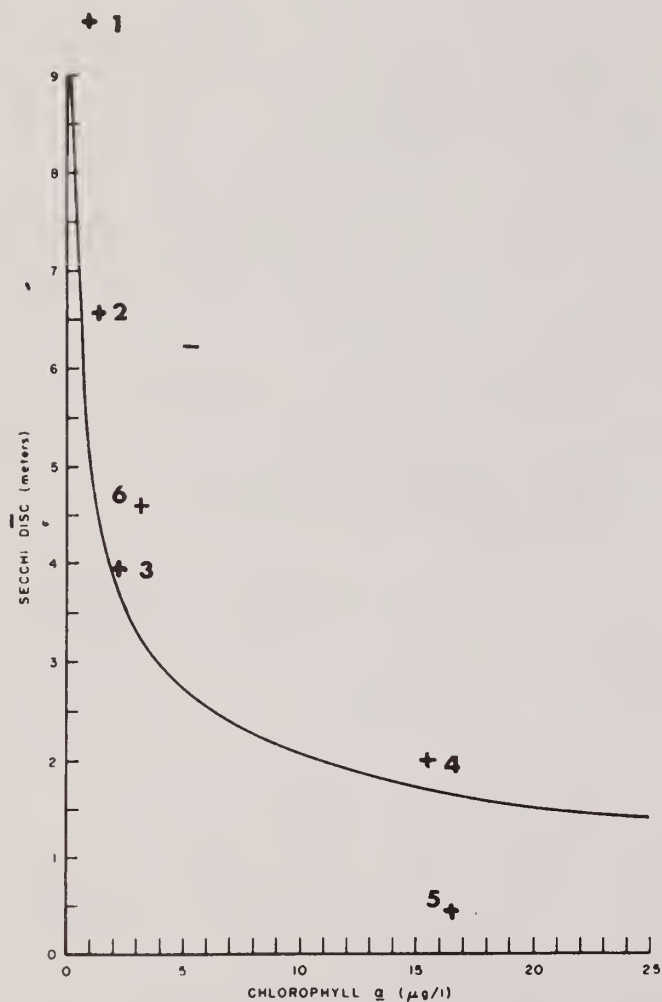
<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Big Straggle Lake.

Date	Stn. S.D.	Chloro. <u>a</u>	
May 21	5.0	4.1	The Secchi disc readings initially declined from the start of the monitoring period, till late June, then increased again and remained relatively constant from mid-July through to September. Although the chlorophyll <u>a</u> concentrations varied considerably (2.1 - 4.6 ug/l) no trend is evident.
May 27	4.5	4.6	
June 3	4.75	3.3	
June 10	4.25	3.0	Based on the seasonal means for these two parameters, the status of Big Straggle Lake would be considered to be between unenriched and moderately enriched. It is characterized by a moderately high degree of water transparency and moderate densities of suspended algae.
June 17	4.0	3.5	
June 24	3.5	4.3	
July 2	3.75	3.1	
July 8	4.0	2.9	
July 15	4.5	2.5	
July 19	5.0	2.4	
July 22	5.0	2.2	
Aug. 7	5.0	2.4	
Aug. 12	5.5	4.2	
Aug. 19	5.0	2.1	
Aug. 26	5.5	3.0	
Sept. 3	5.3	2.3	
Jan	4.6	3.1	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Big Straggle Lake from 1971 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971	3.8	2.1
1972	- -	- -
1973	4.6	4.0
1974	4.8	1.4
1975	6.0	1.7
1976	4.5	1.8
1977	5.7	- -
1978	5.4	2.2
1979	4.6	3.1
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Big Straggle Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Big Straggle Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The seasonal mean Secchi disc reading and chlorophyll a concentration for 1979 is comparable to that measured in 1973. This decline in water transparency and increase in chlorophyll a concentrations is thought not to reflect a change in the quality of the Lake, but rather is due to natural fluctuations. Continued participation in this program is recommended to determine future trends in the water quality of Big Straggle Lake.

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Ontario

BILLINGS LAKE  
Glamorgan Township  
Haliburton

Ministry  
of the  
Environment

Central Region

# SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

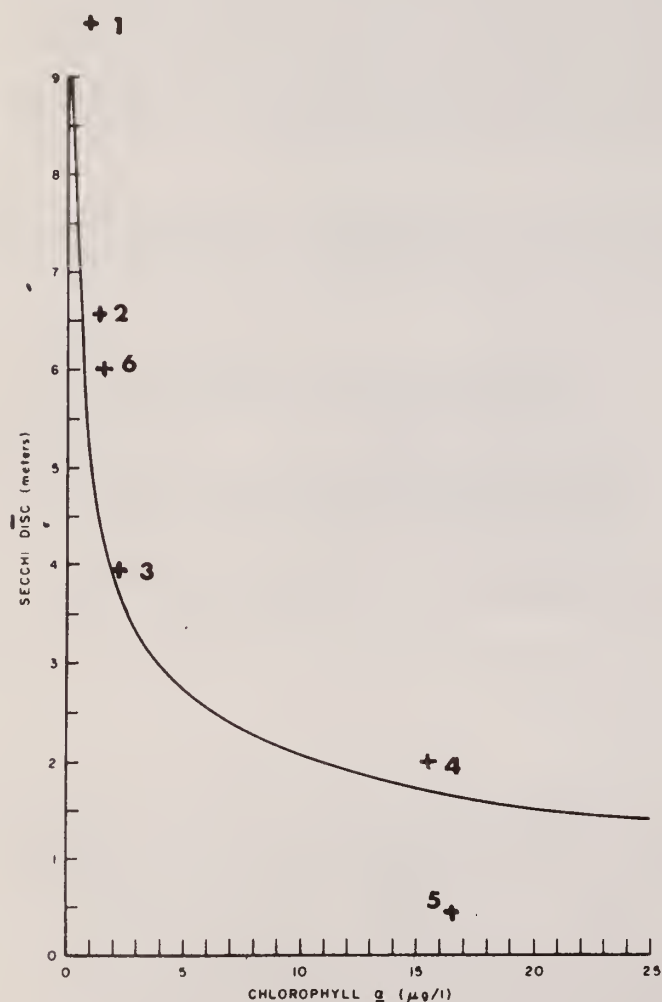
Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Billings Lake.

Date	Stn.	1 S.D.	Chloro. <u>a</u>	
June 3	5.8	2.2	The Secchi disc readings varied from 5.2 to 7.5 metres and the chlorophyll <u>a</u> concentration ranged from 0.8 to 2.7 ug/L during the period sampled. No trends are evident in the variations experienced by either of these parameters. Based on the seasonal means for these two parameters, Billings Lake would be considered unenriched characterized by a high degree of water transparency and low densities of suspended algae.	
June 17	5.2	2.7		
July 2	5.8	1.4		
July 6	5.2	2.5		
July 8	6.7	0.8		
July 16	7.5	1.1		
Aug. 19	6.3	1.8		
Sept. 3	5.2	2.4		
Mean	6.0	1.9		

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Billings Lake from 1973 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973	6.7	1.0
1974	6.5	0.7
1975	6.7	1.2
1976	7.3	1.2
1977	7.2	- -
1978	6.8	2.6
1979	6.0	1.9
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Billings Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Billings Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The decrease in the seasonal mean Secchi disc reading, compared to previous years is thought not to reflect a change in the quality of Billings Lake, but rather, result from natural yearly fluctuations. This is also true of the yearly variations in the seasonal mean chlorophyll a concentration. Continued participation in this program is recommended to determine future trends in the quality of Billings Lake.

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Ontario

BIRCH BARK (TROUGH) LAKE  
GALWAY-CAVENDISH TOWNSHIP  
COUNTY OF PETERBOROUGH

Ministry  
of the  
Environment

Central Region

SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

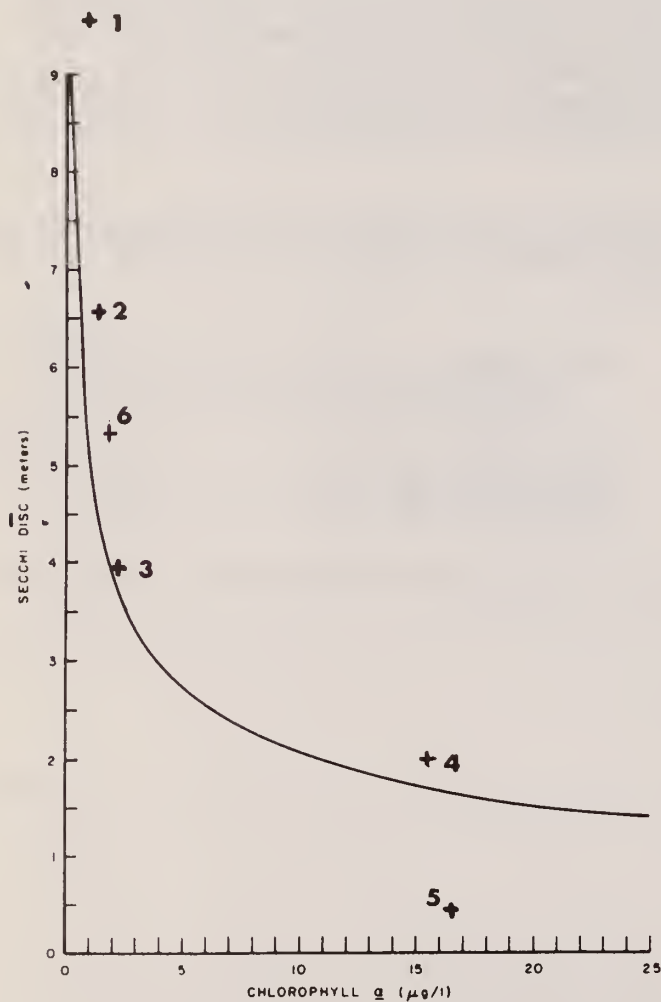
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Birch Bark Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
May 21	5.9	1.5
July 2	5.5	1.1
July 30	5.1	2.5
Aug. 19	5.0	1.3
Sept. 3	5.1	2.6
Sept. 30	5.4	2.0
Oct. 8	5.25	2.4
Mean	<u>5.3</u>	<u>1.9</u>

Very little fluctuation in Secchi disc readings and only minor variation in chlorophyll a concentrations occurred during the sampling period. Based on average values of these two parameters Birch Bark Lake was considered unenriched with low algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Birch Bark Lake for 1977, 1978 and 1979.

	Stn.	
Year	S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977	4.8	- -
1978	5.3	1.8
1979	5.3	1.9
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Birch Bark Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Birch Bark Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

No significant change in the average Secchi disc reading or the chlorophyll a concentration has occurred in the three years of sampling. Continued participation in the sampling program is encouraged to determine any long-term trends.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

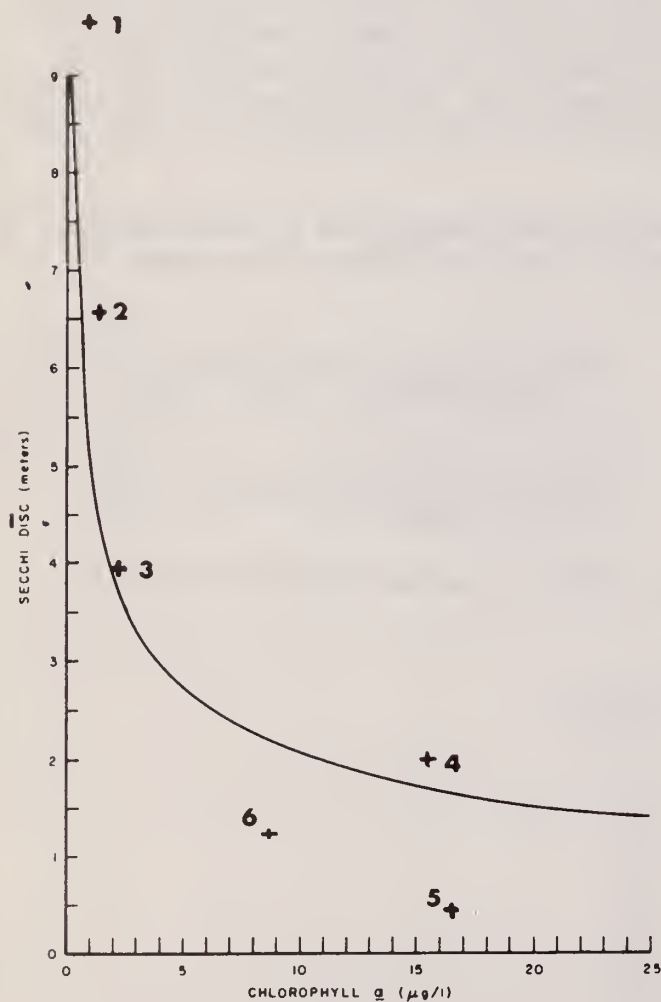
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Black Lake.

Date	Stn.	South End	Stn.	North End
	S.D.	Chloro. <u>a</u>	S.D.	Chloro <u>a</u>
June 4	- -	8.3	- -	13.4
June 17	1.0	17.0	1.0	9.7
June 24	- -	1.6	- -	2.5
July 2	1.25	12.1	1.25	13.0
July 8	1.5	11.2	1.25	9.3
July 15	1.25	5.2	1.25	16.0
July 22	1.8	- -	1.5	17.0
July 30	1.0	9.0	1.0	8.4
Aug. 6	1.5	7.2	1.5	8.2
Aug. 12	1.3	6.5	1.3	7.3
Aug. 19	1.3	7.9	1.5	2.3
Sept. 3	1.0	6.8	1.25	1.2
Mean	1.3	8.4	1.3	9.0

The Secchi disc readings remained relatively constant at both stations, varying from 1.0 to 1.8 metres during the period sampled. The chlorophyll a concentrations exhibited a high degree of variability, ranging from 1.2 to 17.0 ug/L. Based on the seasonal means for these two parameters, Black Lake would be considered enriched, characterized by very poor water transparency and high densities of suspended algae. The colouration of Black Lake results in the degree of water transparency being lower than normally associated the measured density of suspended algae. The variation in water quality between the two stations sampled is minimal.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Black Lake in 1975 and 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>	North S.D.	Chloro <u>a</u>	South S.D.	Chloro <u>a</u>
1971						
1972						
1973						
1974						
1975	1.8	3.8	1.8	4.1	1.8	4.1
1976						
1977						
1978						
1979			1.3	9.0	1.3	8.4
"						



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Black Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Black Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The two years of available data is insufficient to determine if there has been any alteration in the status of Black Lake. The chlorophyll a concentrations in enriched Lakes normally exhibit considerable variability. It is recommended that participation in this program be continued, in order to determine any long-term water quality trends affecting Black Lake.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

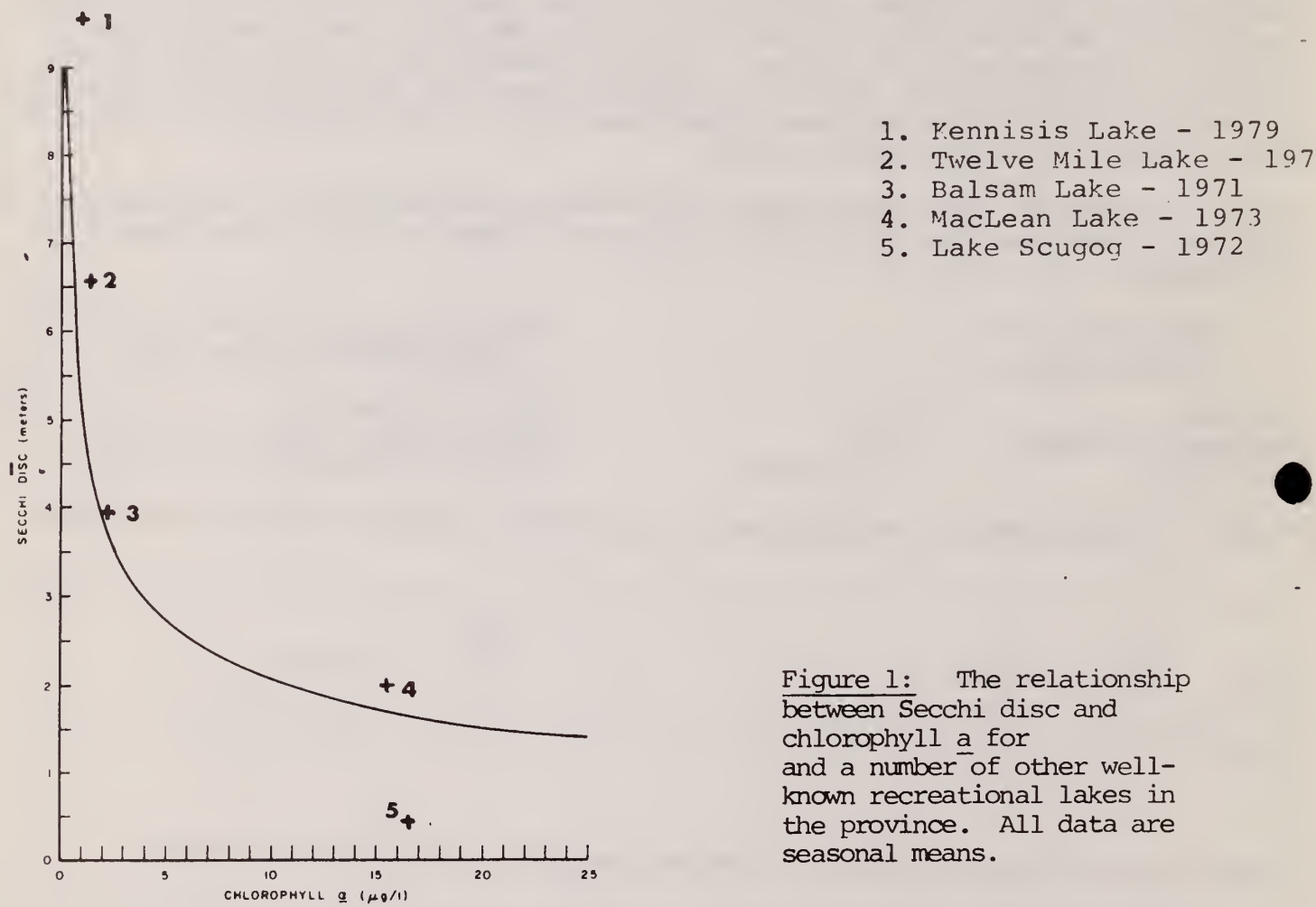
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Blue Hawk Lake.

Date	Stn. S.D.	1 Chloro. <u>a</u>	Stn. S.D.	2 Chloro <u>a</u>
Aug. 12	- -	4.7	- -	5.1

Insufficient data was collected to allow any meaningful conclusions to be made.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Blue Hawk Lake for 1979.

	Stn.		
Year	S.D.	Chloro.	<u>a</u>
1971			
1972			
1973			
1974			
1975			
1976			
1977			
1978			
1979	- -	- -	
"			



If participation in this program is to be continued, then the sampling frequency must be increased, in order that meaningful data may be obtained.





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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

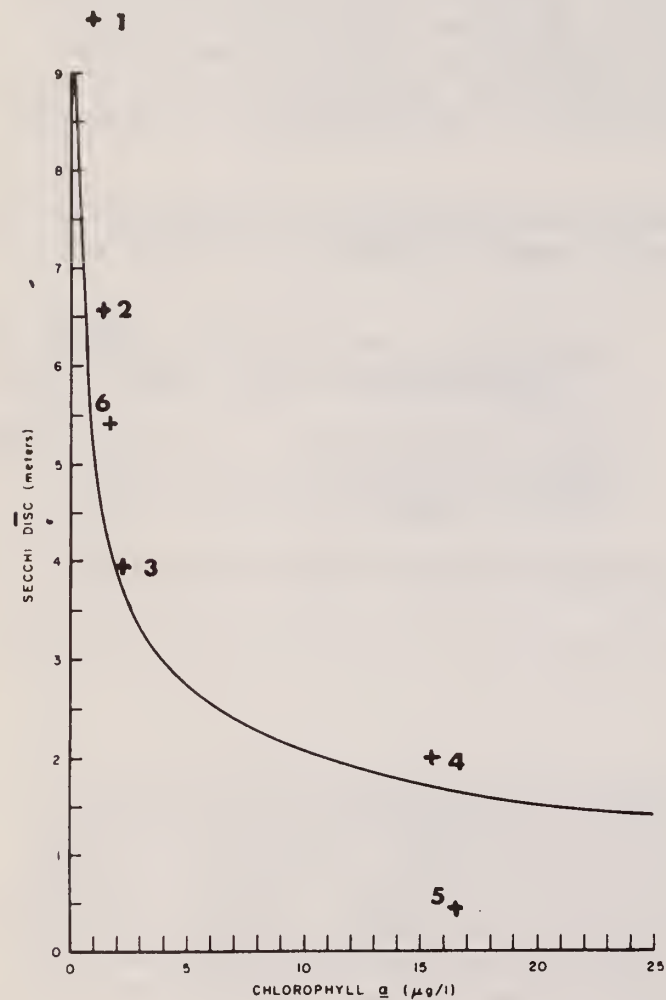
Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Boshkung Lake

Date	Stn.	Main S.D.	Chloro. <u>a</u>
May 21	4.1	1.5	The Secchi disc readings varied from 4.1 to 6.9 metres, and the chlorophyll <u>a</u> concentrations ranged from 0.7 to 2.5 ug/l during the period sampled. No trend is evident in the variations exhibited by either of these parameters. Based on the seasonal means for these parameters, Boshkung Lake would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae.
June 3	4.4	0.9	
" 17	4.4	0.7	
" 24	4.8	1.8	
July 2	5.8	1.6	
" 15	6.9	1.3	
" 29	5.2	1.7	
Aug. 12	5.5	1.9	
" 26	6.8	2.5	
Sept. 3	6.1	1.9	
" 12	5.8	2.2	
Mean	5.4	1.6	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Boshkung Lake for 1972 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972	5.6	0.9
1973	5.6	2.0
1974	- -	0.9
1975	5.2	1.4
1976	- -	- -
1977	6.6	- -
1978	- -	- -
1979	5.4	1.6
"		



- 1. Kennisis Lake - 1979
- 2. Twelve Mile Lake - 1976
- 3. Balsam Lake - 1971
- 4. MacLean Lake - 1973
- 5. Lake Scugog - 1972
- 6. Boshkung Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Boshkung Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The variations in the yearly mean Secchi disc readings and chlorophyll a concentrations have been minimal, and reflect natural fluctuations. The overall enrichment status of Boshkung Lake appears stable. It is recommended that participation in this program be continued, to determine if this condition persists.



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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> (metres - m)		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

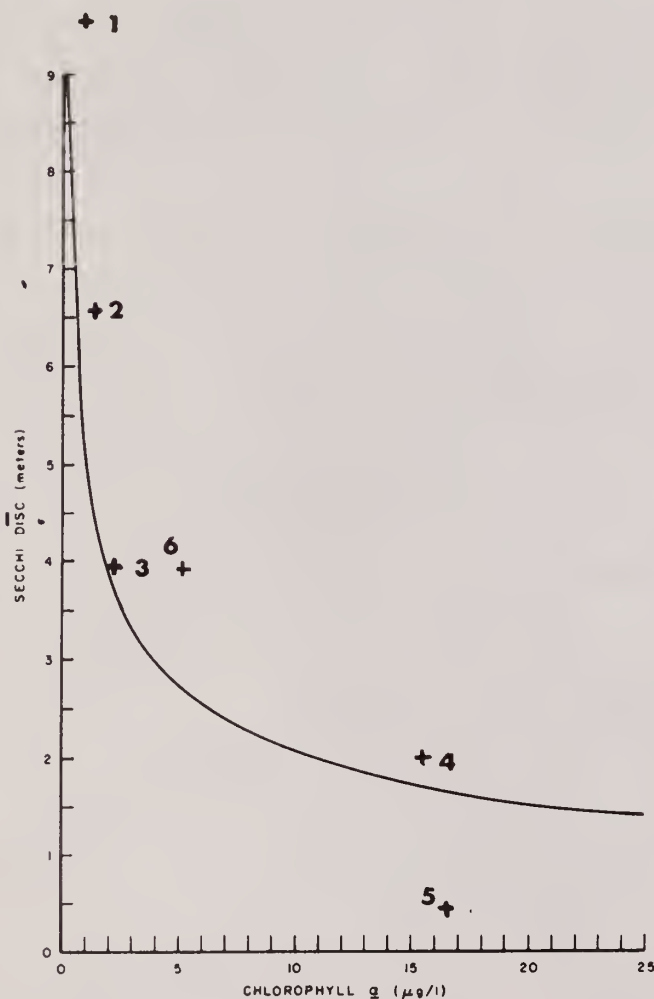
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Bruce Lake.

Date	Stn.	A
	S.D.	Chloro. <u>a</u>
June 21	3.5	6.6
July 3	3.5	5.1
July 15	4.5	4.8
July 29	5.0	<b>6.9</b>
Aug. 9	3.75	7.0
Aug. 20	<u>3.2</u>	<u>1.1</u>
Mean	<u>3.9</u>	<u>5.2</u>

The Secchi disc readings increased from the commencement of sampling till the end of July and then decreased during the remainder of the period sampled. The chlorophyll a concentration exhibited considerable variability, ranging from 1.1 to 7.0 ug/l. Based on the seasonal means for these parameters, Bruce Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Bruce Lake in 1977 to 1979.

	Stn.	
Year	S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977	1.8	- -
1978	3.6	4.8
1979	3.9	5.2
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Bruce Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Bruce Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

During the last two years, the status of Bruce Lake has remained stable. Continued participation in this program is recommended to determine if this trend continues.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

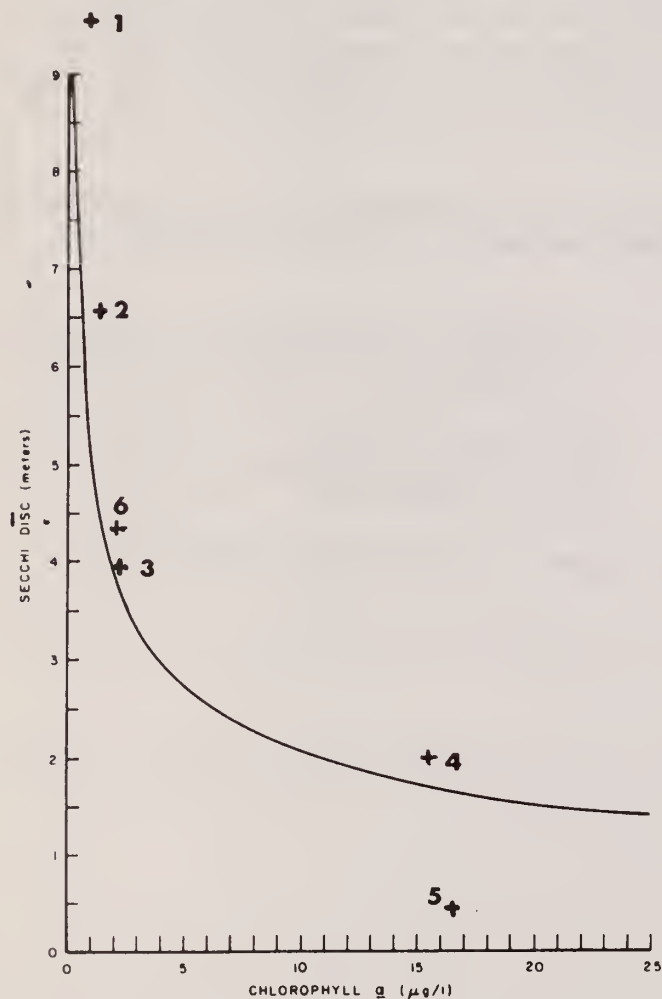
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Canning Lake

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
July 8	2.6	2.3
July 15	3.6	2.4
July 22	5.5	2.7
July 29	4.9	3.4
Aug. 6	4.4	3.3
Aug. 19	4.1	1.6
Aug. 27	5.2	1.6
Sept. 3	4.1	2.2
Mean	4.3	2.4

The Secchi disc readings varied from 2.6 to 5.5 metres during the period sampled, with the poorest readings occurring during the first half of July. The chlorophyll a concentrations ranged from 1.6 to 3.4; the highest concentrations occurring in late July and early August. Based on the seasonal means for these parameters, Canning Lake would be considered moderately enriched, characterized by a moderately high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Canning Lake from 1972 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972	4.6	3.0
1973	5.6	1.8
1974	4.8	1.6
1975	4.9	1.6
1976	5.6	1.9
1977	5.5	- -
1978	4.4	2.3
1979	4.3	2.4
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Canning Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Canning Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Although the yearly mean Secchi disc reading and chlorophyll a concentrations have varied from 4.3 to 5.6 metres and 1.6 to 3.0 ug/l respectively, between 1972 and 1979, the year to year variations have been minimal, and have not allowed any definite trend. The overall condition of Canning Lake appears stable. Continued participation in this program is recommended, to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Catchacoma Lake.

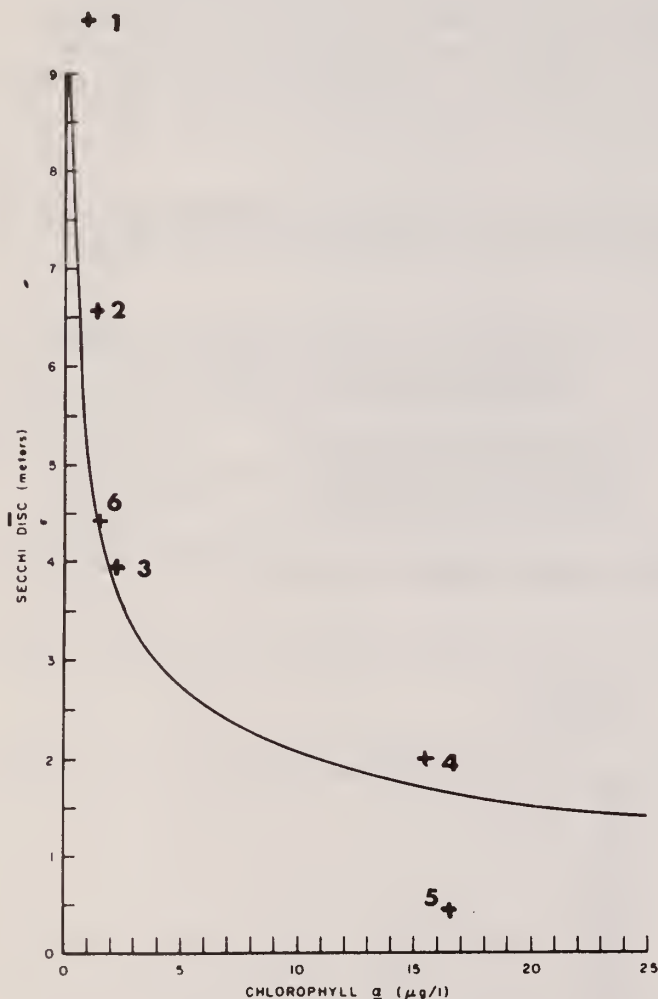
Date	Stn.	30 North	Stn.	4 South
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
June 10	4.25	- -	5.0	0.8
June 24	3.5	2.0	3.0	2.6
July 8	3.5	2.2	5.0	2.2
July 29	5.0	1.6	5.0	0.8
Aug. 12	5.0	1.6	5.0	1.6
Aug. 26	4.0	1.9	4.25	1.4
Sept. 9	4.0	1.8	5.0	1.9
Mean	<u>4.2</u>	<u>1.8</u>	<u>4.6</u>	<u>1.6</u>

Minor fluctuations in the parameters shown in Table 1 were noted during the 1979 season. Based on average values for these two parameters Catchacoma Lake was considered moderately enriched with low algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Catchacoma Lake in 1971, 1977 and 1979.

Year	Stn. 4 S.D.	Chloro. <u>a</u>	Stn. 32 S.D.	Chloro. <u>a</u>
1971	4.2	0.7*	4.2	0.8*
1972				
1973				
1974				
1975				
1976				
1977	4.0		4.3	
1978	-		-	
1979	4.1	1.8	4.5	1.6

\*MOE data



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Catchacoma Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Catchacoma Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Long term trends in the values presented in Table 2 are not apparent at present. Continued participation in the sampling program is encouraged to define these trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll a concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

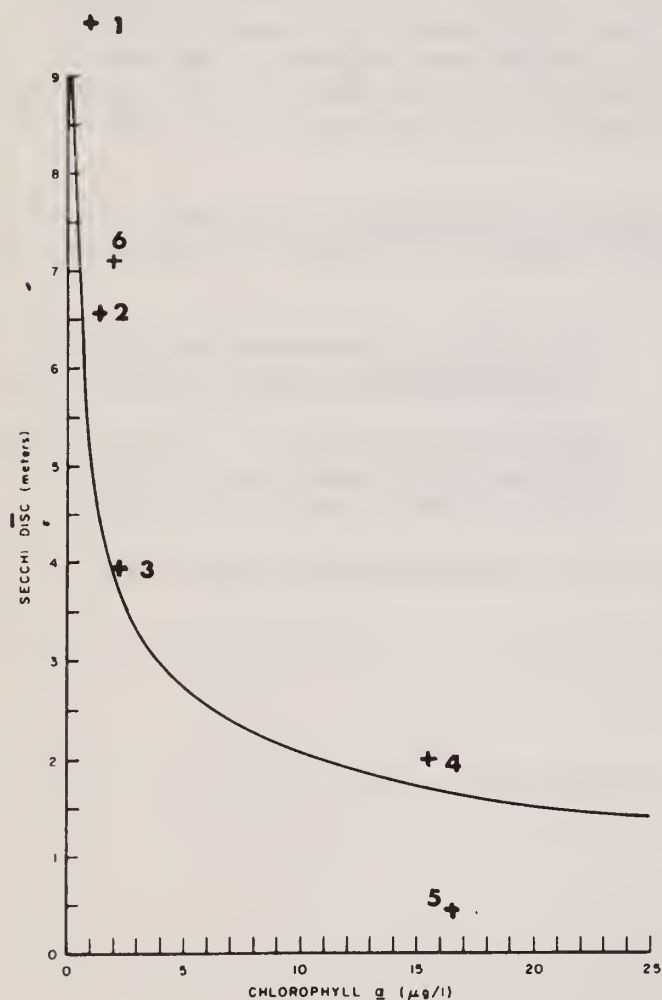
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Clear Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
May 20	6.2	1.8
July 29	7.4	3.7
Aug. 6	6.9	2.8
Aug. 12	7.1	2.8
Aug. 30	6.8	2.2
Sept. 30	7.8	1.8
Oct. 8	7.5	1.2
Mean	7.1	2.3

The Secchi disc readings varied from 6.2 to 7.8 metres, and the chlorophyll a concentrations ranged from 1.2 to 3.7 ug/L; the highest concentrations occurring in late July and early August. Based on the seasonal means for these parameters, Clear Lake would be considered unenriched characterized by a very high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Clear Lake in 1977, 1978 and 1979.

	Stn.	
Year	S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977	7.1	- -
1978	6.6	1.5
1979	7.1	2.3
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Clear Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Clear Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

During the three years this program has been conducted on Clear Lake, the yearly mean Secchi disc readings and chlorophyll a concentrations have exhibited only minor variations, indicating a stable lake condition. Continued participation in this program is recommended, to determine if this trend persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

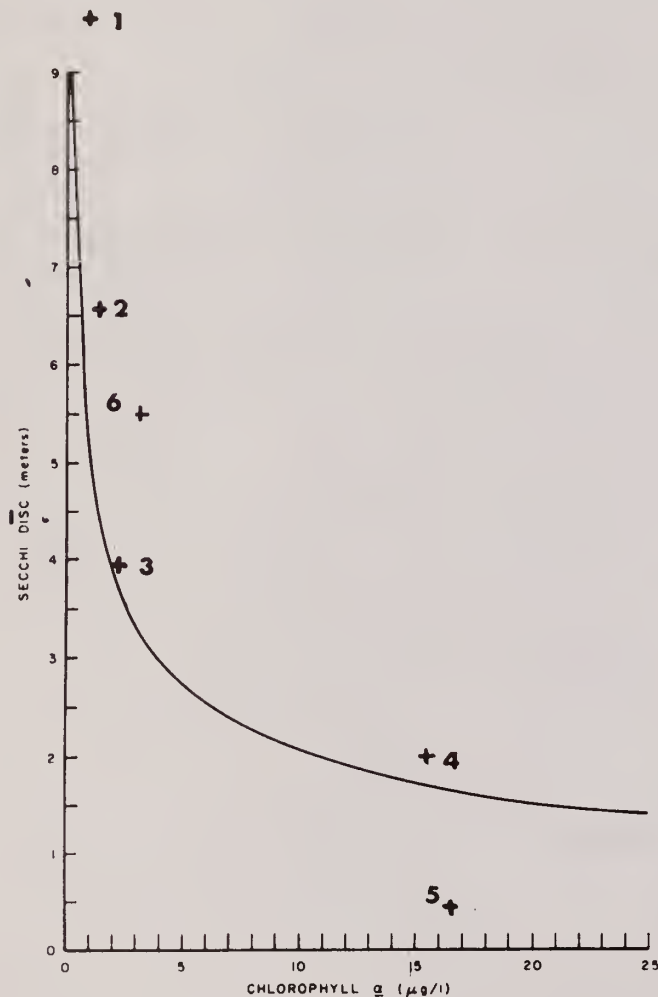
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Clearwater Lake.

Date	Stn. S.D.	1 Chloro. <u>a</u>
July 16	5.0	3.9
July 31	5.5	2.7
Aug. 19	5.5	5.2
Aug. 24	5.0	2.9
Sept. 4	6.0	2.9
Sept. 17	5.5	- -
Sept. 24	<u>6.0</u>	<u>2.7</u>
Mean	<u>5.5</u>	<u>3.4</u>

The Secchi disc readings remained relatively constant during the period sampled, varying only between 5.0 and 6.0 metres. The chlorophyll a concentrations exhibited a greater variability, ranging from 2.7 to 5.2 ug/L. Based on the seasonal means of these two parameters, Clearwater Lake would be considered unenriched, characterized by a high degree of water transparency and moderate densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a ( $\mu\text{g/l}$ ) data collected from Clearwater Lake from 1975 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975	4.3	1.5
1976	5.4	1.8
1977	5.3	- -
1978	5.9	2.5
1979	5.5	3.4
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Clearwater Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Clearwater Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Whereas the yearly mean Secchi disc readings remained relatively constant between 1976 and 1979, the chlorophyll a concentration has increased, particularly this year. The reason for this increase is not apparent. It is recommended that participation in this program be continued to determine future trends in the quality of Clearwater Lake.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Chandos Lake.

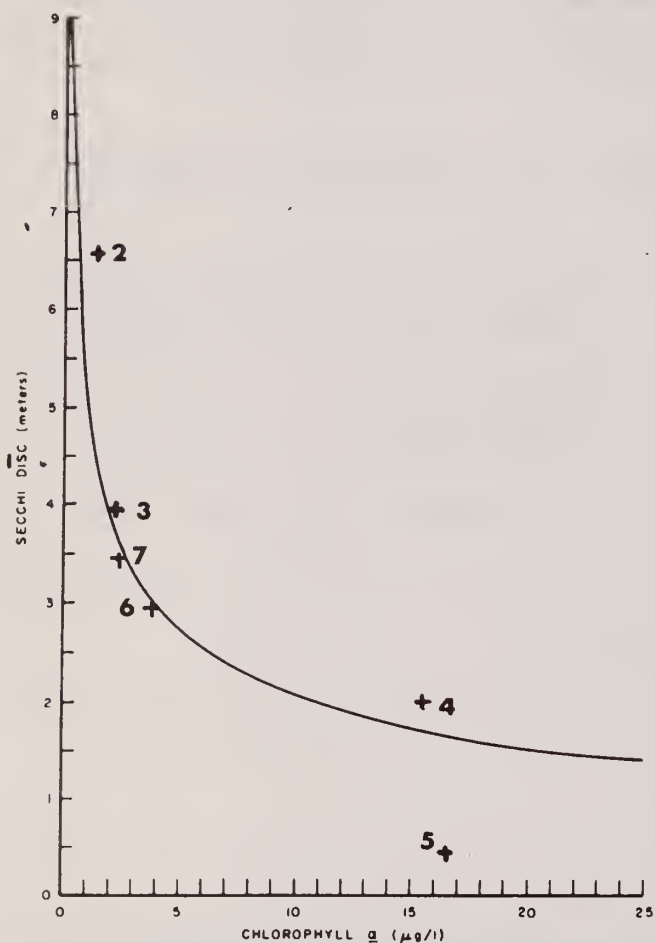
Date	Stn. S.D.	(1) Gilmore Bay Chloro. <u>a</u>	Stn. S.D.	(2) South End Chloro. <u>a</u>
May 30	2.4	4.9	2.7	4.6
June 17	2.7	3.8	2.7	3.0
July 18	3.7	1.9	4.3	0.9
Aug. 9	3.4	3.6	4.0	1.5
Aug. 21	2.9	5.2	3.8	1.0
Mean	3.0	3.9	3.5	2.2

Minor fluctuations in Secchi disc readings were experienced while wide fluctuations were noted in chlorophyll a concentrations. The lack of correspondence between individual Secchi disc readings and chlorophyll a concentrations may be due to an uneven distribution of algae through the water column sampled. Based on the averages of these two parameters Chandos Lake is considered moderately enriched with moderate algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a ( $\mu\text{g/l}$ ) data collected from Chandos Lake from 1972 to 1979.

Year	Stn. S.D.	South Bay (1) Chloro. <u>a</u>	Stn. S.D.	Gilmour Bay Chloro. <u>a</u>	Stn. S.D.	North End Chloro. <u>a</u>	Stn. S.D.	South End Chloro. <u>a</u>
1971								
*1972	3.6	2.0						
**1973	4.9	1.7						
*1974	4.0	1.2						
T 1975	5.2	2.3						
1976	4.0	2.2	3.3	5.2				
1977	4.6	- -	4.4	- -				
1978	4.1	2.6	4.1	4.4	4.1	2.6	4.3	2.7
1979	- -	- -	3.0	3.9	- -	- -	3.5	2.2

\* Mean of 4 Stations - \*\* Mean of 3 Stations - T Based on T Set of data.



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Chandos Lake (G.B) - 1979
7. Chandos Lake (S.E) - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Chandos Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The average Secchi disc reading of the lake has decreased slightly from previous years.

Continued participation in the sampling program especially at the station located in the South End of the lake is encouraged to define long term trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

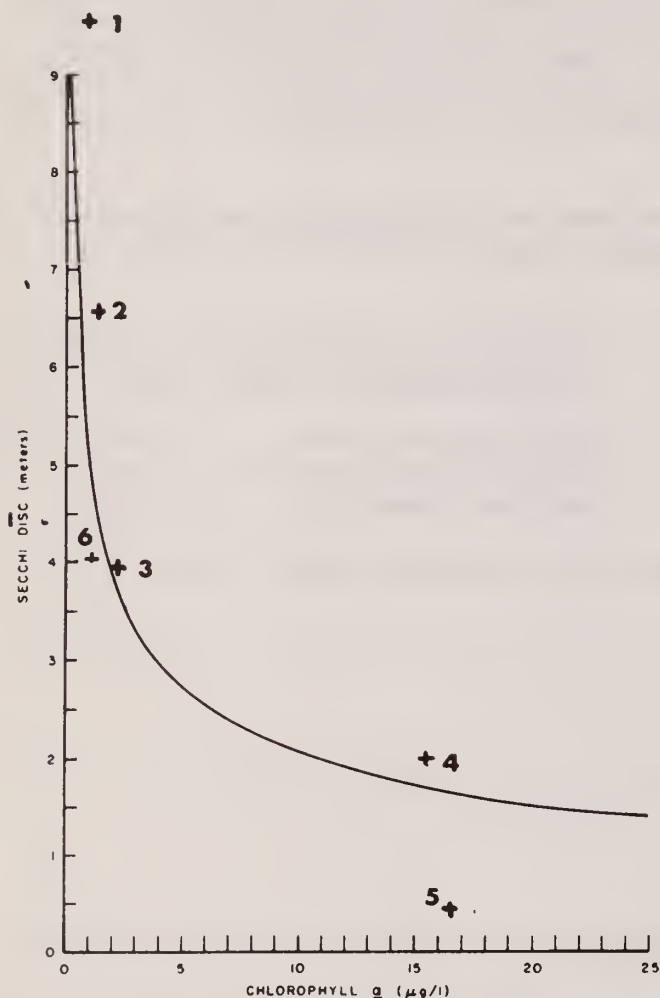
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Cordova Lake.

Date	Stn. S.D.	1 Chloro. <u>a</u>
July 29	3.5	0.7
Aug. 12	4.5	1.7
Mean	<u>4.0</u>	<u>1.2</u>

Insufficient samples was collected to draw meaningful conclusions about the enrichment status of Cordova Lake.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Cordova Lake in 1977 and 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977	4.3	- -
1978		
1979	4.0	1.2
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Cordova Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Cordova Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Continued participation in the sampling program is encouraged with more frequent sampling.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

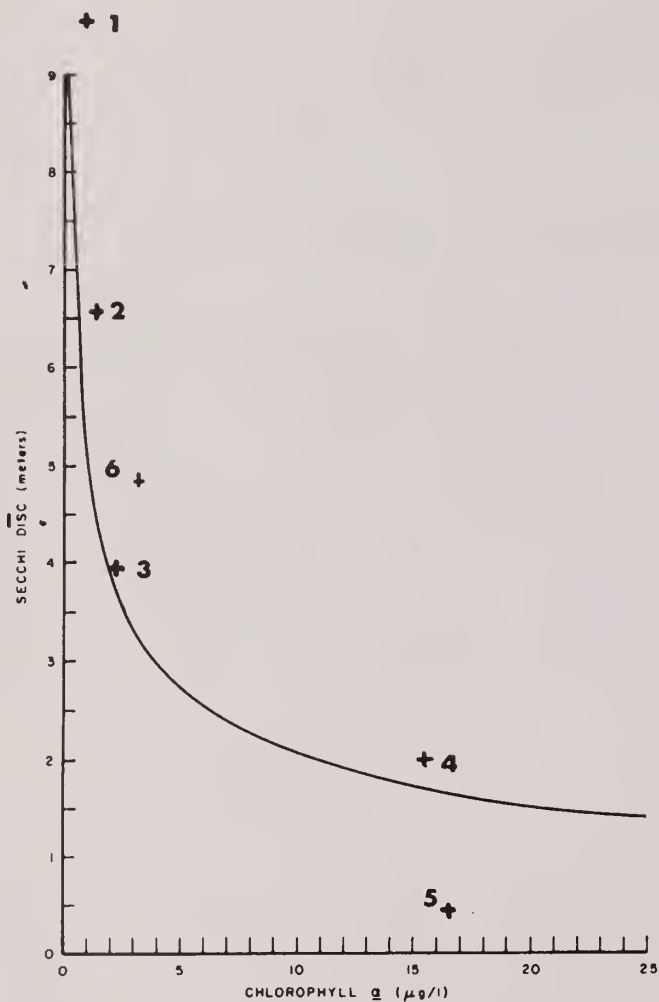
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Crego Lake.

Date	Stn.	1	Stn. 2
	S.D.	Chloro. <u>a</u>	S.D. Chloro. <u>a</u>
June 10	6.0	2.2	- - 2.3
July 8	3.5	4.8	
July 22	4.25	1.6	
Aug. 12	5.0	5.1	
Aug. 26	5.0	2.5	
Sept. 3	4.75	6.1	
Oct. 8	5.0	1.9	
Mean	4.8	3.4	

Fluctuations were noted in both parameters shown in Table 1 over the 1979 season. The lack of correspondence between some individual Secchi disc readings and chlorophyll a concentrations may relate to an uneven distribution of algae through the water column sampled. Based on the average values for these two parameters Crego Lake is bordering unenriched conditions with moderate algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Crego Lake in 1977, 1978 & 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977	4.0	- -
1978	4.3	3.7
1979	4.8	3.4
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Crego Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Crego Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

There may have been a slight increase in water clarity since 1979 but only with continued participation in the sampling program can longterm trends be defined.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Crystal Lake.

Date	Stn.	A	Stn.	B	Stn.	C	Stn.	D
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
June 8	5.0	2.3	5.7	3.2	4.0	1.2	5.0	1.4
June 24	5.0	3.3	5.0	5.9	4.0	2.8	6.0	3.3
July 8	6.0	2.0	5.5	3.9	5.0	2.2	4.0	2.7
July 21	6.0	2.1	5.0	1.9	5.0	1.6	4.5	2.2
Aug. 12	4.5	1.7	4.5	1.8	5.0	3.0	4.0	1.7
Sept. 9	5.5	1.8	5.0	1.8	5.0	1.5	4.5	1.7
Sept. 23	6.0	2.7	6.0	6.4	5.75	2.3	5.5	2.1
Mean	5.4	2.3	5.2	3.6	4.8	2.1	4.8	2.2

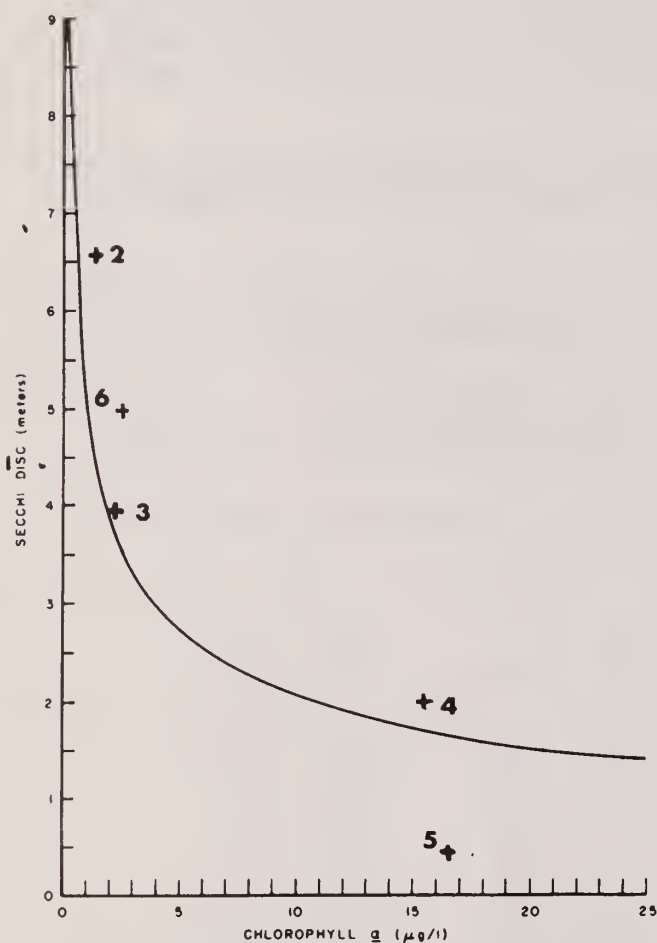
The Secchi disc readings fluctuated very little over the sampling period. Upper Black Bay and Clear Bay, represented by Stations A and B, had only slightly higher average readings than the main body of the lake, (Stations C and D). The lack of correspondence between some individual chlorophyll a concentrations and Secchi disc readings may relate to an uneven distribution of algae -through the water column. Based on average values for these two parameters, Crystal Lake was bordering unenriched conditions with moderate algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Crystal Lake in 1977, 1978 & 1979.

Year	Stn. A S.D. Chloro. <u>a</u>	Stn. B S.D. Chloro. <u>a</u>	Stn. C S.D. Chloro. <u>a</u>	Stn. D S.D. Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976				
1977	4.5	4.3	5.1	4.2
1978	5.4 2.7	4.8 3.1	5.4 4.0	3.8 3.6
1979	5.4 2.3	5.2 3.6	4.8 2.1	4.8 2.2
*1977	5.1			

\*Average values from samples taken during a comparable time period by MOE staff.

+ 1



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Crystal Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Crystal Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

There does not appear to be any significant change in the environment status of Crystal Lake since 1977. Continued participation in the sampling program is encouraged to define long term trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

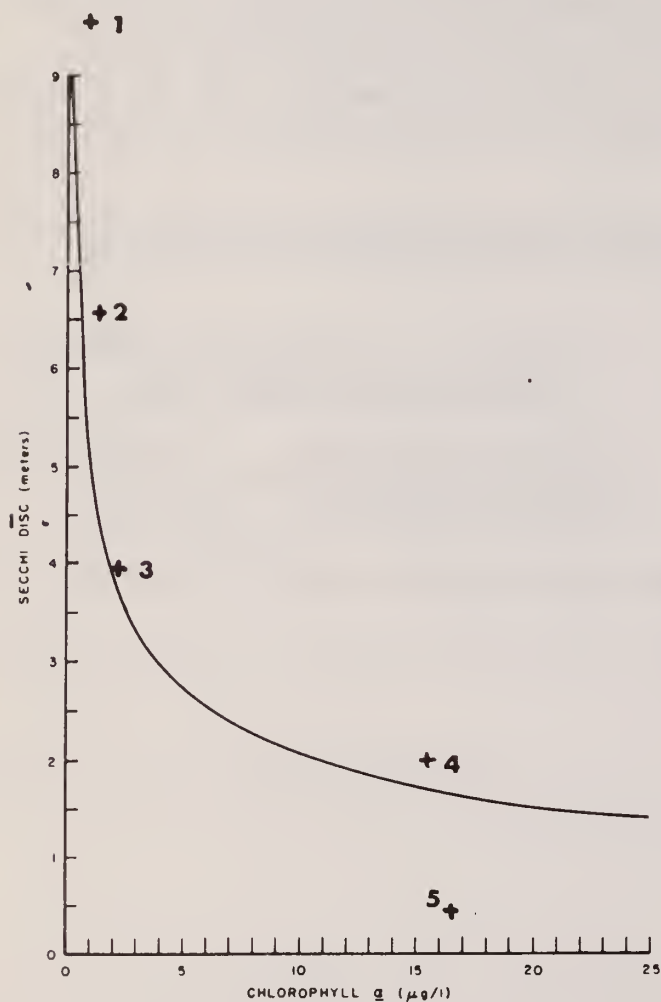
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Doeskin Lake

Date	Stn. S.D.	Main Chloro. <u>a</u>
July 2	1.3	7.3
	- -	14.6
		<u>11.0</u>

Insufficient data was collected to allow any meaningful conclusions to be made.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Doeskin Lake in 1978 and 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977		
1978	1.2	4.5
1979	- -	11.0
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Doeskin Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Doeskin Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to continue, the sampling frequency must be increased in order to obtain meaningful data.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

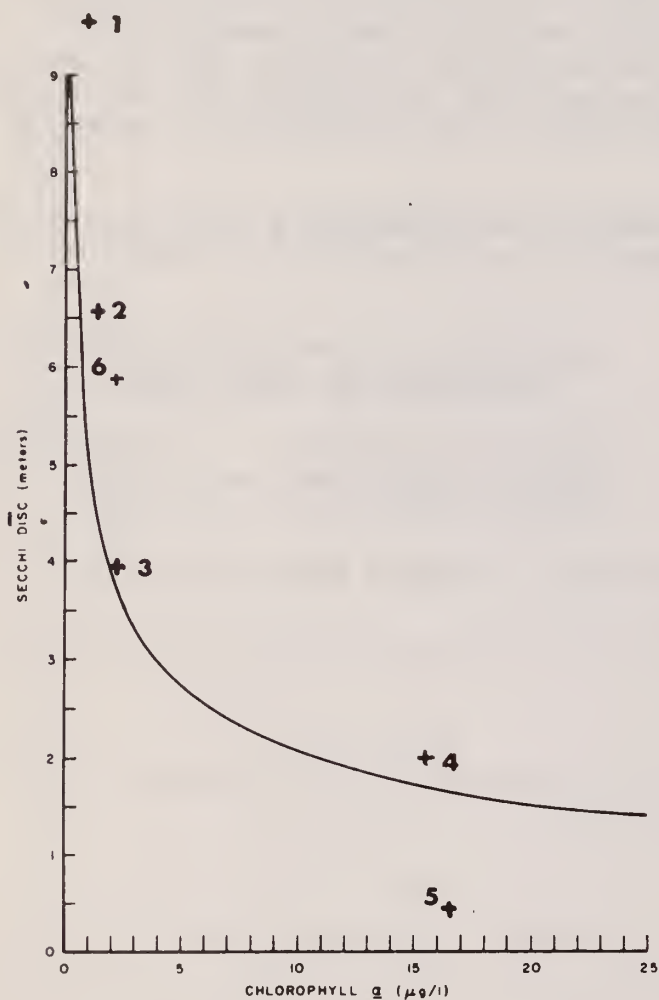
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Drag Lake.

Date	Stn.	Main S.D.	Chloro. <u>a</u>
June 8	5.8	3.4	
July 15	5.8	1.9	
July 22	5.2	1.3	
July 29	6.1	3.0	
Aug. 12	6.1	1.9	
Aug. 19	6.1	3.1	
Sept. 3	6.1	1.4	
Mean	5.9	2.3	

The Secchi disc readings remained relatively constant, varying from 5.2 to 6.1 metres during the period sampled. The chlorophyll a concentrations exhibited greater variability, ranging from 1.3 to 3.4 ug/L. Based on the seasonal means of these two parameters, Drag Lake would be considered unenriched, characterized by a high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Drag Lake from 1973 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973	6.0	2.9
1974	6.2	0.6
1975	6.8	1.4
1976	5.8	2.4
1977	6.4	- -
1978	6.3	1.7
1979	5.9	2.3



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Drag Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Drag Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Since commencement of this program on Drag Lake in 1973, the yearly mean Secchi disc readings have varied from 5.8 to 6.8 metres and the chlorophyll a concentrations have ranged from 0.6 to 2.9 ug/L. This degree of variability is within the range attributable to natural fluctuations. The overall status of Drag Lake appears stable. Continued participation in this program is recommended, to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Dummer Lake.

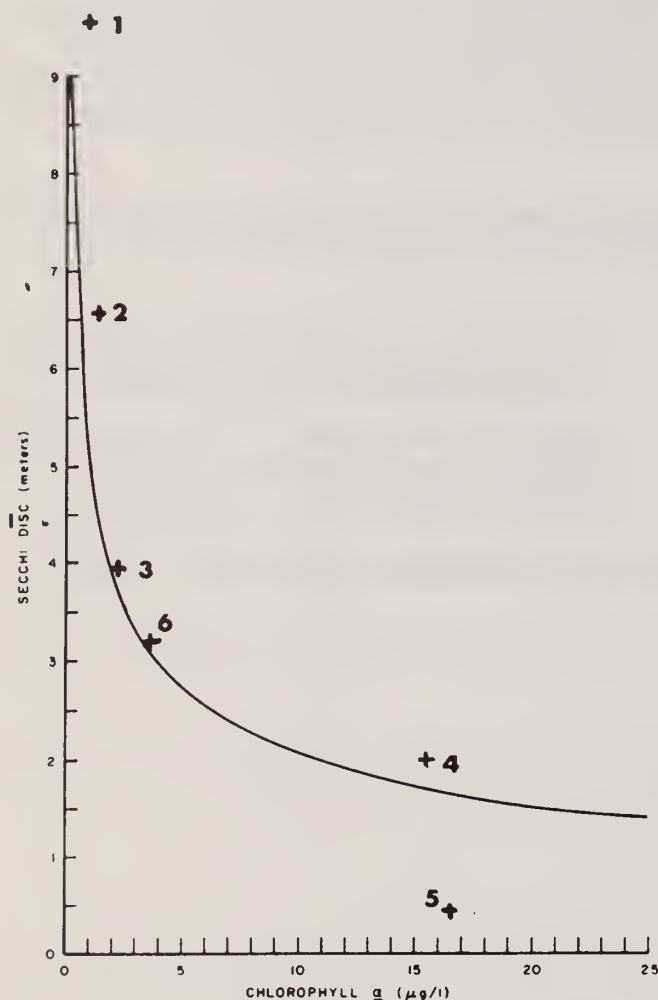
Date	Stn.	1	
	S.D.	Chloro. <u>a</u>	
May 21	3.5	1.5	
June 3	4.0	2.9	
June 17	3.0	2.8	
July 2	3.0	4.0	
July 15	2.75	- -	
July 29	4.0	2.3	
Aug. 12	2.75	2.8	
Aug. 19	2.75	9.8	
Sept. 3	3.5	- -	
Mean	<u>3.2</u>	<u>3.7</u>	

The variation in values presented in Table 1 may be due to natural fluctuations. Based on the seasonal average values for Secchi disc readings and chlorophyll a concentration, Dummer Lake is considered moderately enriched with moderate algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Dummer Lake in 1978 and 1979.

Year	Stn.	S.D.	Chloro. <u>a</u>
1971			
1972			
1973			
1974			
1975			
1976			
1977			
1978		3.2	2.8
1979		3.2	3.7
1978*		3.8	3.9

\* Mean values from MOE/7 Links Water Quality Survey 1978.



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Dummer Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Dummer Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The seasonal mean Secchi disc reading and mean chlorophyll a concentration has remained relatively stable over the last two years. However, only with continued participation in the sampling program can long term trends in enrichment status be defined.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.)  
(metres - m)

Chlorophyll a concentrations (Chloro. a)  
(micrograms per litre - ug/l)

enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

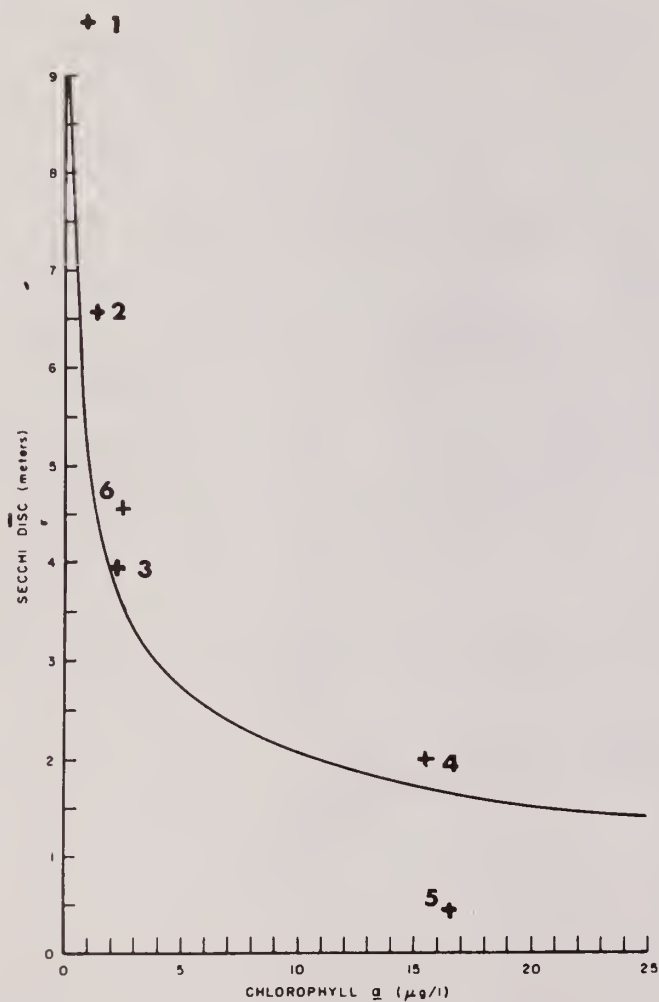
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from East Lake.

Date	Stn.	Main S.D.	Chloro. <u>a</u>
May 21	4.0	3.9	
June 3	5.0	3.7	
June 10	4.0	3.1	
June 17	4.0	2.8	
June 24	4.5	2.7	
July 2	4.0	2.3	
July 8	4.5	3.2	
July 15	4.75	1.4	
July 22	5.0	2.5	
July 29	5.0	3.3	
Aug. 6	4.75	2.4	
Aug. 12	5.0	2.0	
Aug. 19	5.5	2.1	
Sept. 3	5.0	2.6	
Mean	4.6	2.7	

The Secchi disc readings remained relatively constant, only varying from 4.0 to 5.5 metres during the period sampled. The chlorophyll a concentrations exhibited greater variability, ranging from 1.4 to 3.9 ug/L. No trends are apparent in the variations experienced by either of these parameters. Based on the seasonal means for these two parameters, East Lake would be considered moderately enriched, characterized by a moderately high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from East Lake from 1971 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971	4.3	2.7
1972	- -	- -
1973	5.0	1.9
1974	3.6	1.5
1975	4.2	2.2
1976	4.2	2.3
1977	4.2	- -
1978	4.6	2.3
1979	4.6	2.7
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. East Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for East Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The yearly variations in the seasonal mean Secchi disc readings and chlorophyll a concentrations since 1975 have been minimal, indicative of a stable lake condition. Continued participation in this program is recommended to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

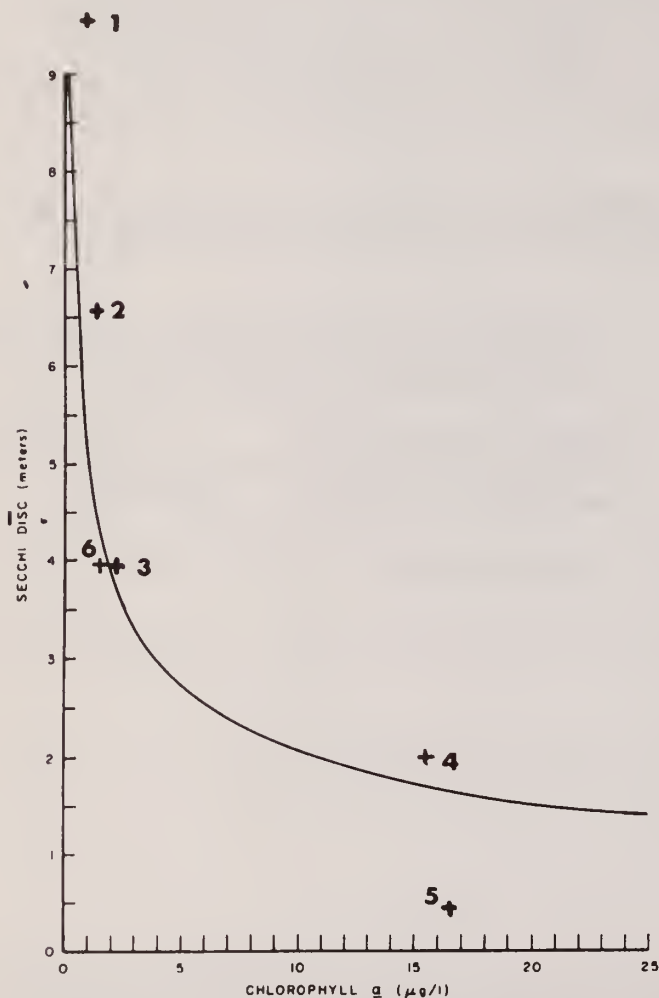
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Fairy Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
July 9	4.2	1.3
July 15	3.1	2.2
Aug. 11	5.5	1.1
Sept. 9	3.1	1.6
Mean	<u>4.0</u>	<u>1.6</u>

Since samples were collected on only four occasions, it is difficult to obtain a reasonably accurate assessment of Fairy Lake's trophic status. The Ministry sampled Fairy Lake on seven occasions in 1979. The Secchi disc readings ranged from 2.8 to 4.5 metres, and averaged 3.6 metres. The chlorophyll a concentration varied from 0.6 to 2.1 ug/L and averaged 1.2 ug/L. Based on this study, Fairy Lake would be considered to be between an unenriched and a moderately enriched lake. The colouration of Fairy Lake results in Secchi disc readings which are less than normal, for the measured density of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Fairy Lake from 1974 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>	
1971			
1972			
1973			
*1974	3.6	12.1	
1975	3.8	2.2	
1976	- -	- -	
1977	4.1	- -	
1978	3.7	1.2	
1979	4.0	1.6	(3.7m., 1.6 ug/L, MOE)
"			*One set of data only.



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Fairy Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Fairy Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to continue, then the sampling frequency must be increased in order to obtain meaningful data.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Farlain Lake.

Date	Stn.	Main S.D.	Chloro. <u>a</u>
May 21	3.5	1.5	
June 3	BTM	1.4	
June 17	BTM	-	
June 25	BTM	1.8	
July 8	BTM	0.9	
July 16	BTM	1.4	
Aug. 6	BTM	2.2	
Sept. 3	2.5	2.7	
Sept. 9	3.5	1.7	
Mean	-	1.7	

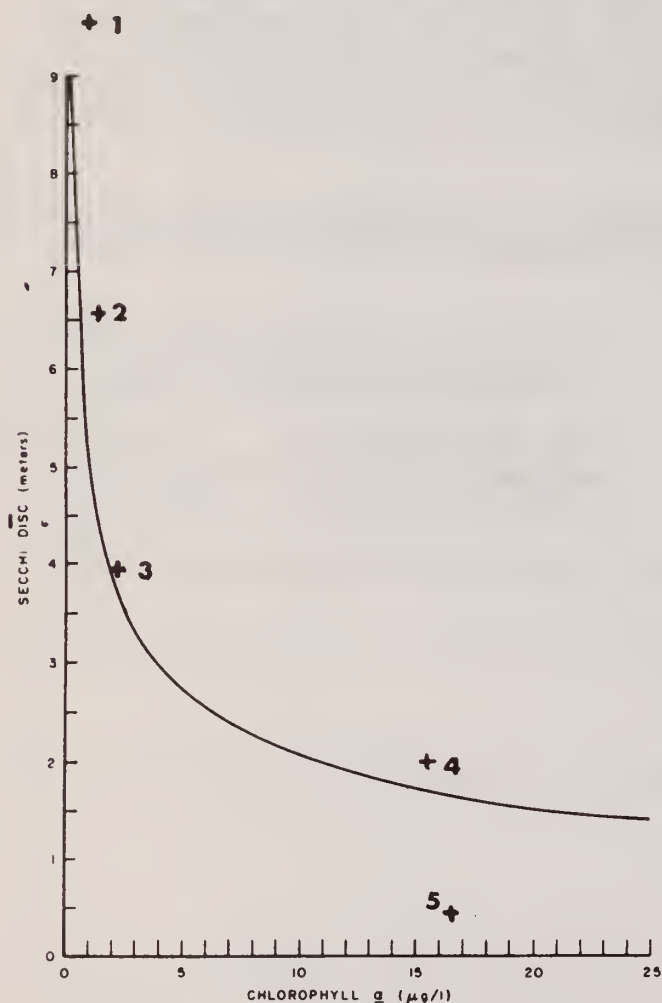
BTM - Bottom, depth  
approximately 4m.

Since the Secchi disc was still visible on the bottom of the lake on most sampling dates, it is not possible to obtain a representative seasonal mean value for this parameter. The chlorophyll a concentrations ranged from 0.9 to 2.7 ug/L during the period sampled, the highest concentrations being measured in September. Based on the 1979 data, Farlain Lake could be considered to be between an unenriched lake and a moderately enriched lake. It is characterized by a moderately high degree of water transparency and low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Farlain Lake for 1978 and 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
* 1973	3.9	2.2
1974		
1975		
1976		
1977		
1978	3.7	2.3
1979	- -	1.7
"		

\*MOE Data



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972

Figure 1: The relationship between Secchi disc and chlorophyll a for Farlain Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Based on the available historical data, the condition of Farlain Lake appears stable. Continued participation in this program is required to determine if this condition persists.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

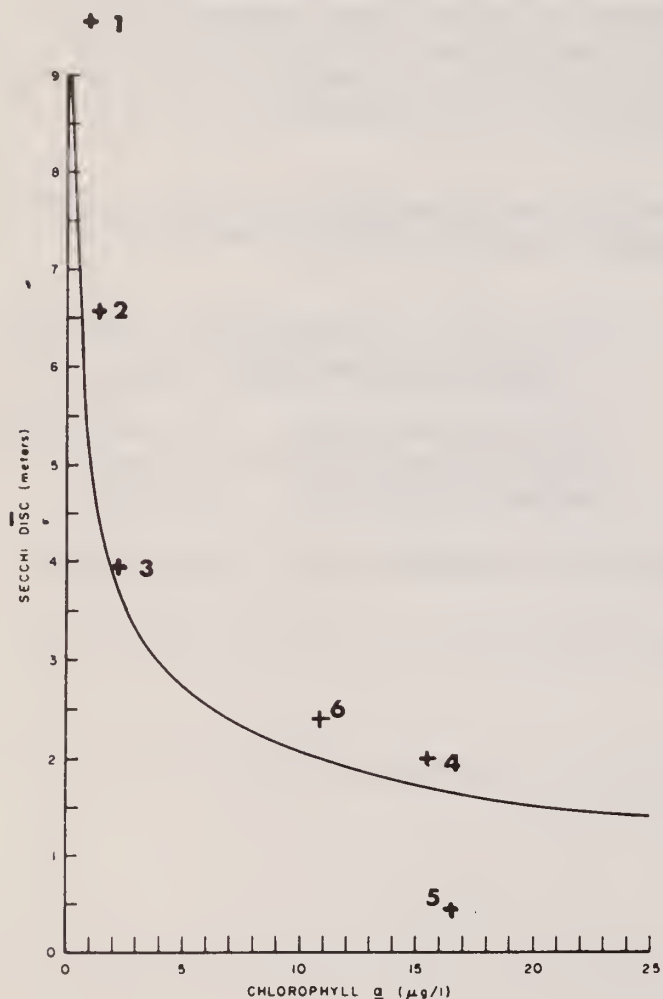
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from George's Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
May 21	2.0	7.9
May 27	2.5	8.2
June 3	3.0	10.8
June 10	2.5	10.2
June 17	2.5	13.9
June 24	2.0	11.8
July 2	2.0	12.8
July 8	2.0	11.1
July 22	3.0	10.4
July 29	2.5	12.0
Aug. 6	3.0	8.0
Aug. 12	3.0	7.2
Aug. 19	2.5	8.2
Sept. 3	2.5	16.8
Mean	2.5	10.7

The Secchi disc readings remained relatively constant, varying from 2.0 to 3.0 metres during the period sampled. The chlorophyll a concentrations were more variable, ranging from 7.2 to 16.8 ug/L. No trends are apparent in the fluctuations exhibited by either of these parameters. Based on the seasonal means of these parameters, George's Lake would be considered enriched, characterized by a low degree of water transparency and very high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from George's Lake from 1973 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>	Stn. S.D.	"0" Chloro. <u>a</u>
1971				
1972				
1973	2.2	5.8	- -	- -
1974	2.3	3.0	2.2	3.9
1975	2.5	10.2	2.0	6.4
1976	2.6	7.2	- -	- -
1977	2.8	- -	- -	- -
1978	2.6	10.3	- -	- -
1979	2.5	10.7		
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. George's Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for George's Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The variation in the season mean Secchi disc reading and chlorophyll a concentration between 1978 and 1979 is minimal, indicating no change in the Lake's status. Continued participation in this program is recommended to determine if this trend continues.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> (metres - m)		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

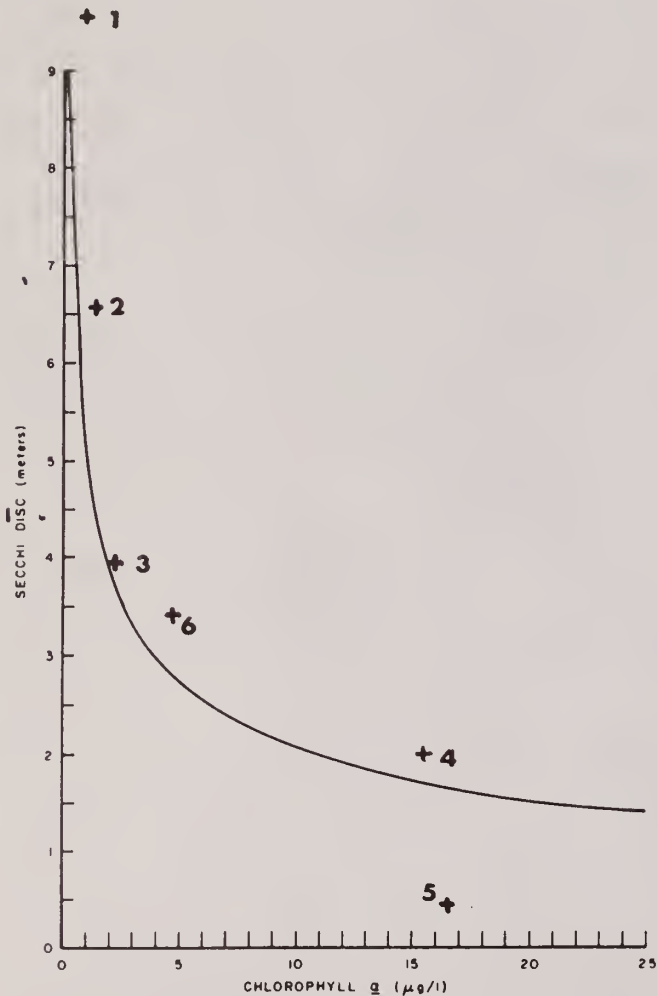
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Gibson Lake.

Date	Stn.	A	
	S.D.	Chloro. <u>a</u>	
June 3	2.5	-	-
June 24	2.5	3.3	
July 22	3.5	8.7	
Aug. 19	3.5	3.1	
Sept. 16	5.0	3.6	
Mean	<u>3.4</u>	<u>4.7</u>	

Both the Secchi disc readings and the chlorophyll a concentrations exhibited considerable variability during the period sampled. The Secchi disc readings ranged from 2.5 to 5.0 metres; the chlorophyll a concentrations varied from 3.1 to 8.7 ug/l. Based on the seasonal means of these two parameters, Gibson Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and moderate densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Gibson Lake in 1978 and 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977		
1978	3.5	3.8
1979	3.4	4.7
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Gibson Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Gibson Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The variation in the seasonal mean Secchi disc reading and chlorophyll a concentration between 1978 and 1979 is within the range attributable to natural fluctuations. Additional data will be required to comment on the Lake's stability and therefore continued participation in this program is recommended.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

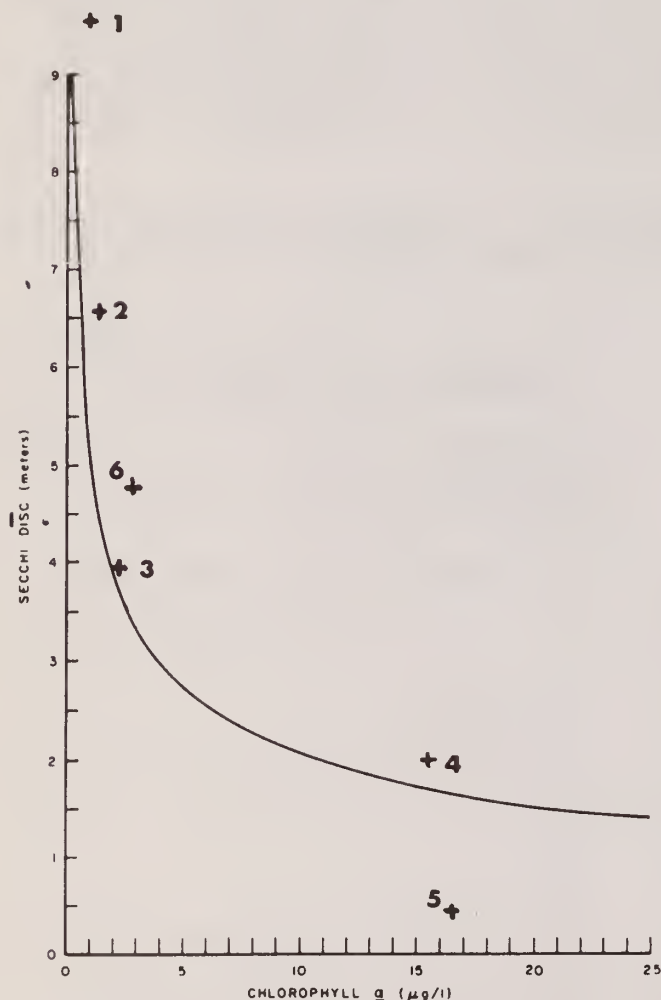
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Go Home Lake.

Date	Stn. S.D.	A(South End) Chloro. <u>a</u>	Stn. B S.D.	(North End) Chloro. <u>a</u>
July 8	4.5	3.9	4.5	2.5
July 15	5.0	2.3	4.5	2.2
July 22	5.0	3.7	4.5	3.1
July 29	5.0	3.7	5.3	2.8
Aug. 26	5.0	2.8	4.5	2.3
Sept. 3	4.5	- -	4.0	2.5
Mean	4.8	3.2	4.6	2.6

The Secchi disc readings at both stations remained almost constant during the period sampled, varying only from 4.0 to 5.3 metres. The chlorophyll a concentrations were only slightly more variable, ranging from 2.2 to 3.9 ug/L. No trends are evident in the fluctuation experienced by either of these parameters. Based on the seasonal means of these two parameters, Go Home Lake in the vicinity of these stations would be considered moderately enriched, characterized by a moderately high degree of water transparency and moderate densities of suspended algae. These differences in water quality between the two locations sampled is minimal.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Go Home Lake in 1971, 1976, 1977 and 1979.

Year	Stn. S.D.	North Chloro. <u>a</u>	Stn. S.D.	South Chloro. <u>a</u>
1971	3.6	1.4		
1972				
1973				
1974				
1975				
1976	5.6	1.9		
1977	6.2	- -		
1978	- -	- -		
1979	4.6	2.6	4.8	3.2
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Go Home Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Go Home Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The historical record of yearly mean Secchi disc and chlorophyll a concentrations is sketchy. The available data indicates no trend in the year to year variations, indicating the overall condition of Go Home Lake is probably stable. Continued participation in this program is recommended in order to monitor future trends in the quality of Go Home Lake.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Gull Lake.

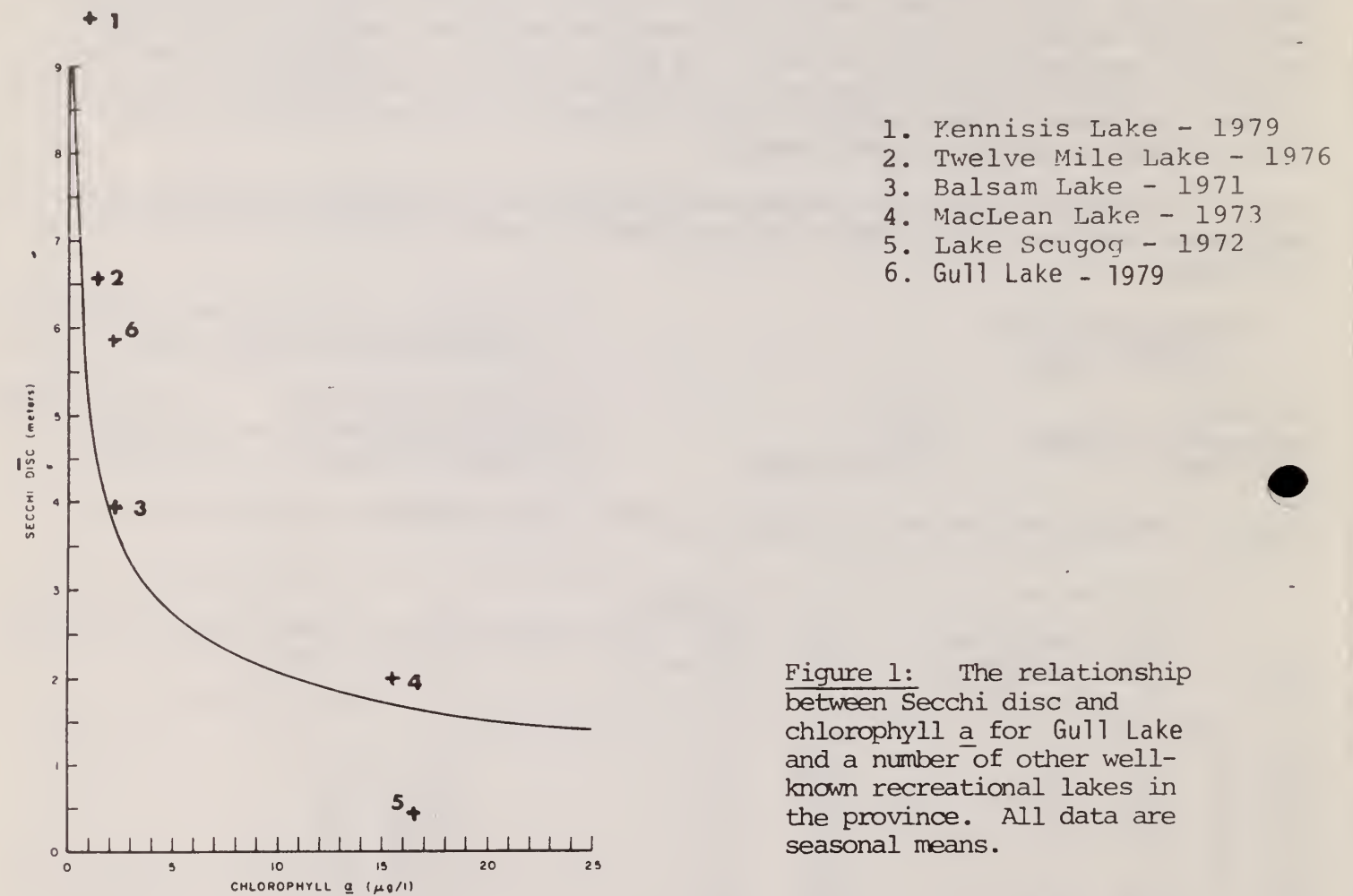
Date	Stn.1 (North End)		Stn.2 (Deep Bay Gull River Estuary)		Stn.3 (Long Island)		Stn.4 (Miners Bay)	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
July 8	- -	- -	4.75	1.7	- -	- -	4.5	2.3
July 15	5.5	1.5	6.25	1.5	5.6	1.7	5.25	1.9
July 22	6.3	2.0	5.9	1.9	6.3	1.9	5.9	1.9
July 29	6.0	2.1	8.0	2.2	6.5	2.3	7.5	2.0
Aug. 12	- -	- -	6.75	2.2	6.75	1.9	- -	- -
Aug. 19	4.25	2.4	5.0	2.5	4.5	2.1	4.75	3.0
Mean	5.5	2.0	6.1	2.0	5.9	2.0	5.6	2.2

Although the Secchi disc readings at most of the stations varied considerably, the chlorophyll a concentrations remained fairly uniform. Based on the seasonal means for these two parameters, all four stations sampled would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae. The difference in water quality between the four locations sampled is minimal.



Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Gull Lake from 1976 to 1979.

Year	Stn. - 1		Stn. - 2		Stn. - 3		Stn. - 4	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
1971								
1972								
1973								
1974								
1975								
1976	5.4	1.9	3.7	1.5	5.7	2.0	5.5	2.0
1977	4.7	- -	- -	- -	5.8	- -	5.4	- -
1978	4.6	1.8	5.5	2.0	5.5	1.9	5.4	1.7
1979	5.5	2.0	6.1	2.0	5.9	2.0	5.6	2.2
"								



All four sampling locations exhibited a slight improvement in water transparency compared to 1978. This is probably due to natural fluctuations rather than an alteration in the lake's quality. Continued participation in this program is recommended, to determine future water quality trends.





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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

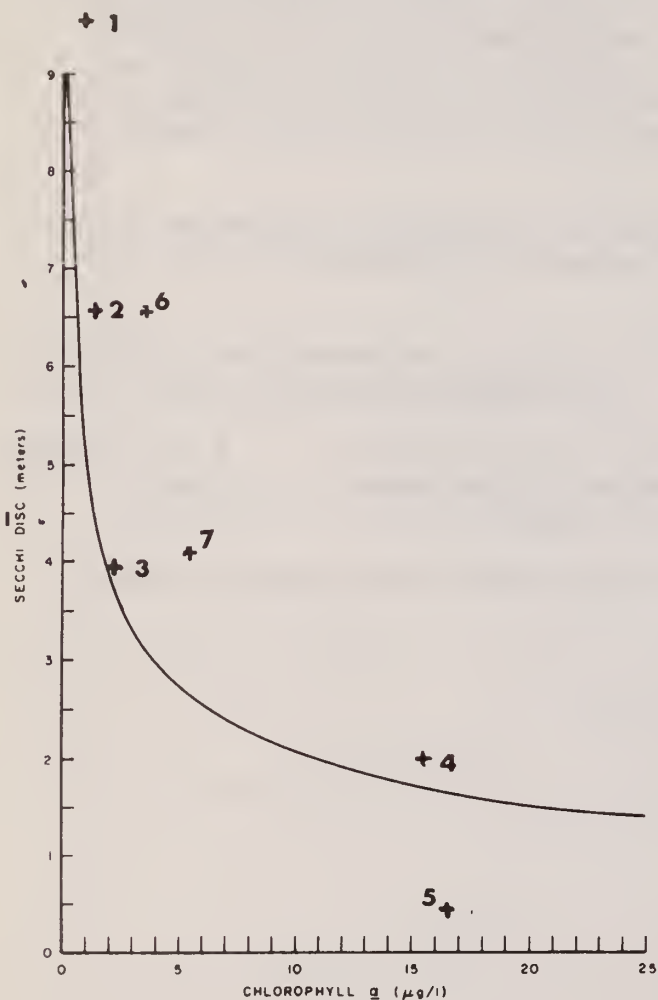
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Haliburton Lake.

Date	Stn. S.D.	South Bay Chloro. <u>a</u>	Main (North End)	
			Stn. S.D.	Chloro. <u>a</u>
May 21	3.0	5.1	- -	- -
June 3	4.0	3.5	- -	- -
June 10	3.25	4.0	- -	- -
June 17	4.0	4.4	- -	- -
June 24	3.5	6.1	7.0	2.0
July 1	3.75	6.3	6.0	2.6
July 8	4.0	5.5	6.5	2.8
July 15	4.5	5.7	6.5	2.8
July 22	4.5	2.3	5.5	4.1
July 29	4.75	8.3	6.5	4.3
Aug. 6	- -	- -	7.0	4.3
Aug. 12	4.8	5.7	7.0	3.3
Aug. 19	5.0	6.3	6.5	4.2
Aug. 26	4.75	6.3	6.5	4.1
Sept. 3	4.25	5.3	- -	- -
Mean	4.1	5.3	6.5	3.4

The variability of both the Secchi disc readings and chlorophyll a concentrations were greater at the South Bay sampling location, than at the Main sampling location. No trends are apparent in the fluctuations experienced by either of these parameters. Based on the seasonal means of these parameters, the South Bay Station would be considered moderately enriched, characterized by a moderate degree of water transparency and high densities of suspended algae. Using the same parameters, the main station would be considered unenriched, characterized by a high degree of water transparency and moderate densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Haliburton Lake from 1972 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>	Stn. - S. Bay S.D.	Chloro. <u>a</u>
1971				
* 1972	6.3	1.0	3.5	2.7
1973	6.0	1.8	- -	- -
1974	6.7	1.1	3.8	2.4
1975	6.4	2.5	3.6	3.3
1976	6.0	1.7	4.0	4.7
1977	7.6		4.3	-
1978	7.3	1.9	4.2	3.2
1979	6.5	3.4	4.1	5.3
"	* from Dillon (1974)			



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Haliburton Lake (Main)- 1979
7. Haliburton Lake (S.Bay) - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Haliburton Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Whereas the 1979 seasonal mean Secchi disc reading at both stations is comparable to that from previous years, there was a significant increase in the seasonal mean chlorophyll a concentrations. No reason is apparent for this increase. It is recommended that participation in this program be continued, in order to determine future trends in water quality.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

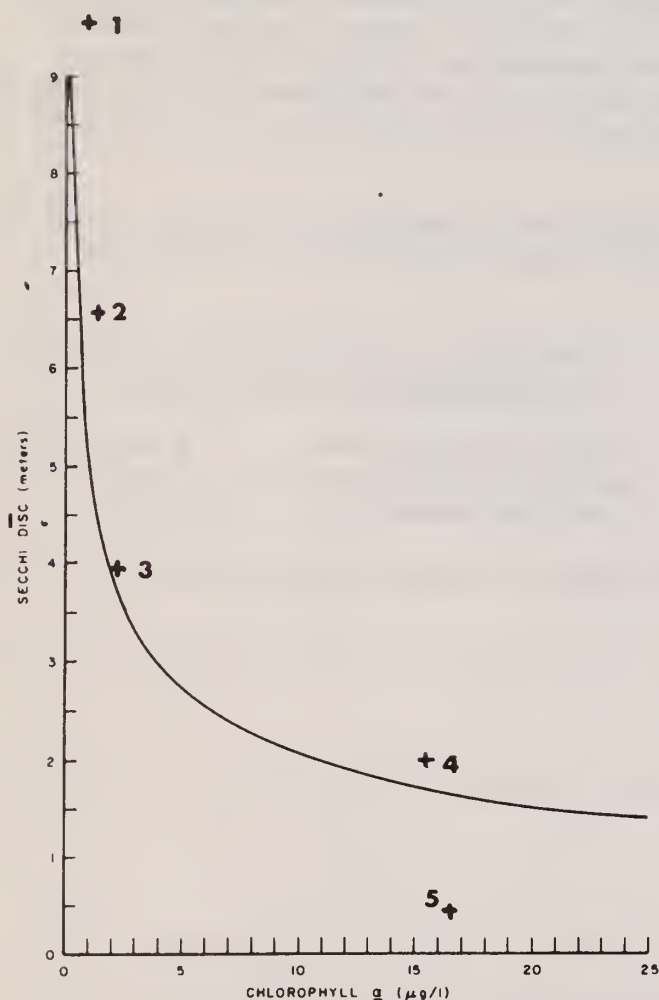
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Halls Lake.

Date	Stn. S.D.	Chloro. <u>a</u>
Aug. 6	8.25	1.9
" 12	7.5	0.9
" 19	7.5	1.8
Mean	<u>7.8</u>	<u>1.5</u>

Insufficient data was collected to allow any meaningful conclusions to be made.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Halls Lake from 1972 to 1979.

	Stn.	
Year	S.D.	Chloro. <u>a</u>
1971		
1972	8.7	0.7
1973	7.8	0.7
1974	7.5	0.4
1975	8.4	0.6
1976	7.5	1.1
1977	8.5	- -
1978	8.6	0.9
1979	- -	- -
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972

Figure 1: The relationship between Secchi disc and chlorophyll a for and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to be continued then the sampling frequency must be increased, in order that meaningful data may be obtained.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Harp Lake.

Date	Stn.	S.D.	Main Chloro. <u>a</u>
July	2	3.6	3.2
"	22	4.6	2.7
Aug.	4	5.2	3.1
"	19	4.9	2.3
Mean		<u>4.6</u>	<u>2.8</u>

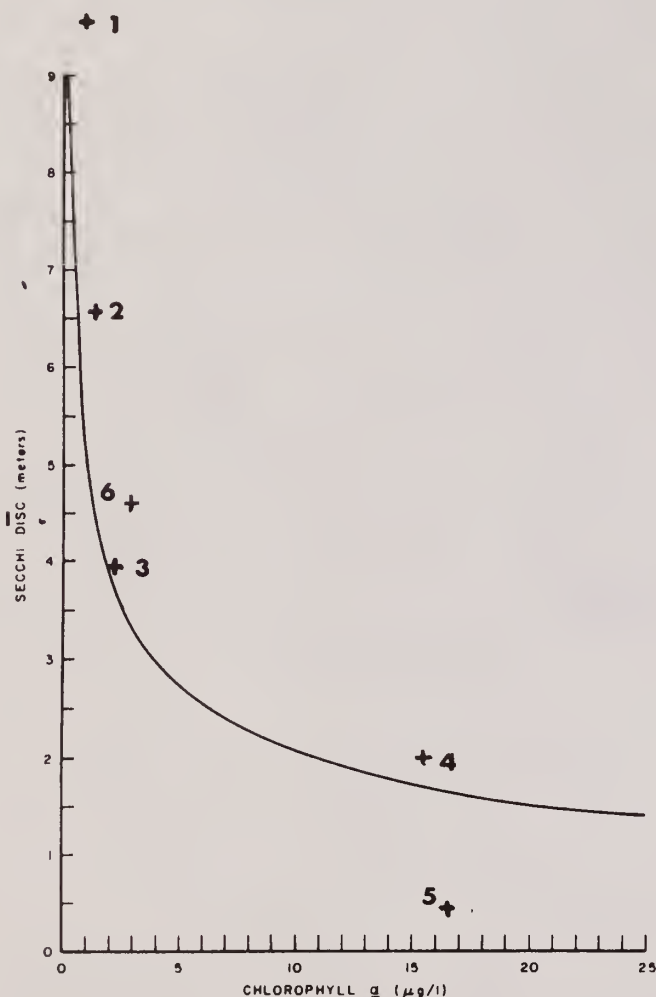
Since samples were collected on only four occasions it is difficult to obtain a reasonably accurate assessment of Harp Lake's enrichment status. Based on the means of the available data, Harp Lake would be considered moderately enriched, characterized by a moderately high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Harp Lake from 1973 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
------	-----------	-----------------------

1971		
1972		
1973	4.0	3.3
1974	3.7	2.1
1975	5.0	3.3
*1976	4.5	2.2
1977	4.8	
1978	4.5	1.9
1979	4.6	2.8

\*based on 2 samplings



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Harp Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Harp Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The year to year variations in the seasonal mean Secchi disc readings and chlorophyll a concentrations are attributable to natural fluctuations. The overall status of Harp Lake appears stable.

If participation in this program is continued, then the sampling frequency should be increased, in order to obtain meaningful data.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

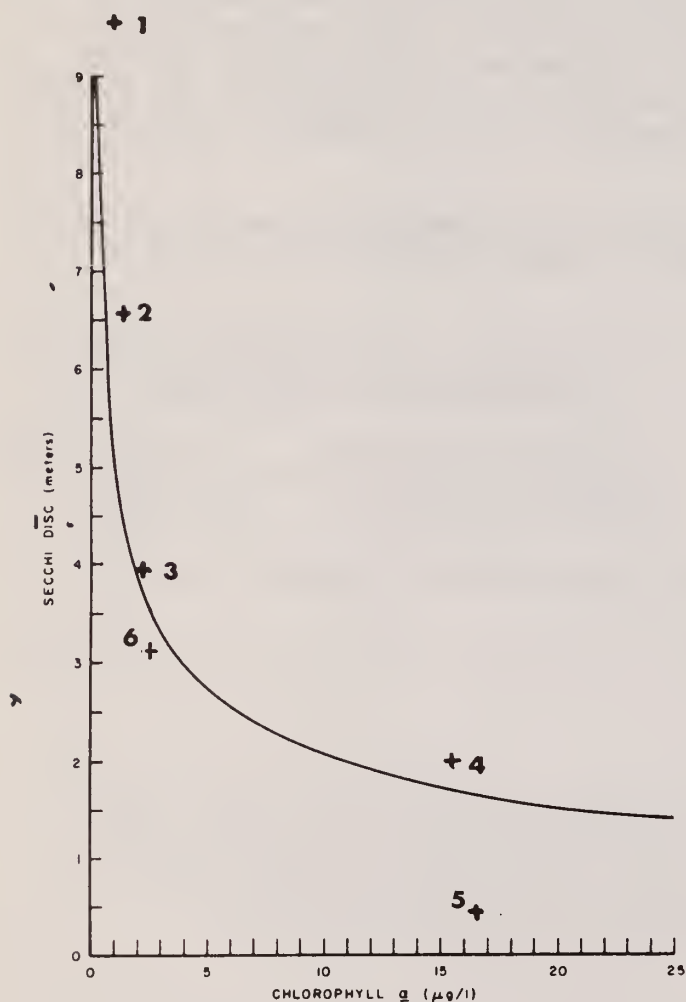
<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Head Lake.

Date	Stn.	Main	
	S.D.	Chloro. <u>a</u>	
May 21	3.0	2.1	An excellent sampling program was carried out on the lake during 1979. Based on the mean values of Secchi disc and chlorophyll <u>a</u> concentrations, Head Lake was considered moderately enriched with moderate algal densities.
May 27	3.5	1.4	
June 3	3.0	3.2	
June 10	3.5	2.4	
June 17	3.25	1.8	
June 24	3.5	2.4	
July 2	3.0	2.6	
July 8	4.0	1.7	
July 15	3.5	2.8	
July 22	3.25	5.0	
July 29	3.75	2.9	
Aug. 6	2.75	2.8	
Aug. 12	2.5	3.9	
Aug. 19	2.0	3.1	
Aug. 26	3.0	2.4	
Sept. 3	3.0	- -	
Mean	<u>3.2</u>	<u>2.5</u>	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Head Lake from 1972 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972	3.2	2.8
1973	2.9	3.0
1974	2.8	2.0
1975	2.8	2.7
1976	3.0	2.9
1977	3.3	- -
1978	2.9	2.5
1979	3.2	2.5



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Head Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Head Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Year to year mean values for both Secchi disc readings and chlorophyll a concentrations, as shown in Table 2, indicate relatively stable enrichment status for Head Lake. Continued participation in the sampling program is recommended to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

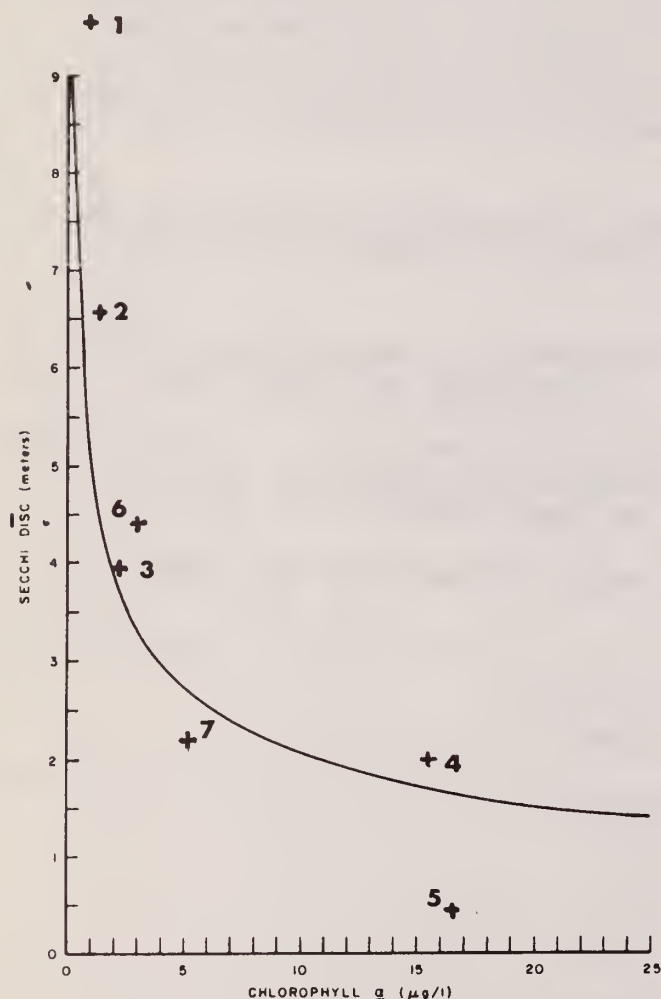
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Jack Lake.

Date	Stn. S.D.	Sharp's Bay Chloro. <u>a</u>	Stn. S.D.	Brook's Bay Chloro. <u>a</u>
May 21	3.7	3.5	2.4	12.0
June 17	4.2	2.9	3.0	3.7
July 15	5.4	4.1	3.0	4.1
Aug. 6	4.3	2.9	3.4	5.3
Aug. 26	4.3	3.0	3.0	4.6
Sept. 3	4.0	- -	3.5	2.8
Sept. 23	5.0	2.2	4.0	3.4
Mean	<u>4.4</u>	<u>3.1</u>	<u>2.2</u>	<u>5.1</u>

Individual values of Secchi disc and chlorophyll a concentration may not correspond because algae may have been unevenly distributed through the water column. Based on mean values for the two parameters, Sharpe's Bay was considered moderately enriched with moderate algal densities while Brook's Bay was considered enriched with high algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Jack Lake from 1971 to 1979.

Year	Stn. S.D.	Sharp's Bay Chloro. <u>a</u>	Stn. S.D.	Brook's Bay Chloro. <u>a</u>
1971				
1972			3.9	2.6
1973				
1974	4.4	1.4	3.4	1.9
1975				
1976	4.5	2.9	3.4	3.7
1977	4.7		3.5	
1978	4.7	2.6	3.3	3.9
1978*	5.2	2.6	3.8	3.4
1979	4.4	3.1	2.2	5.1



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Jack Lake (Sharp's Bay) - 1979
7. Jack Lake (Brook's Bay) - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Jack Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

In view of the apparent decline in water clarity and increase in algal density in Brook's Bay, continued participation in the sampling program is encouraged to define long term trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Kahshe Lake.

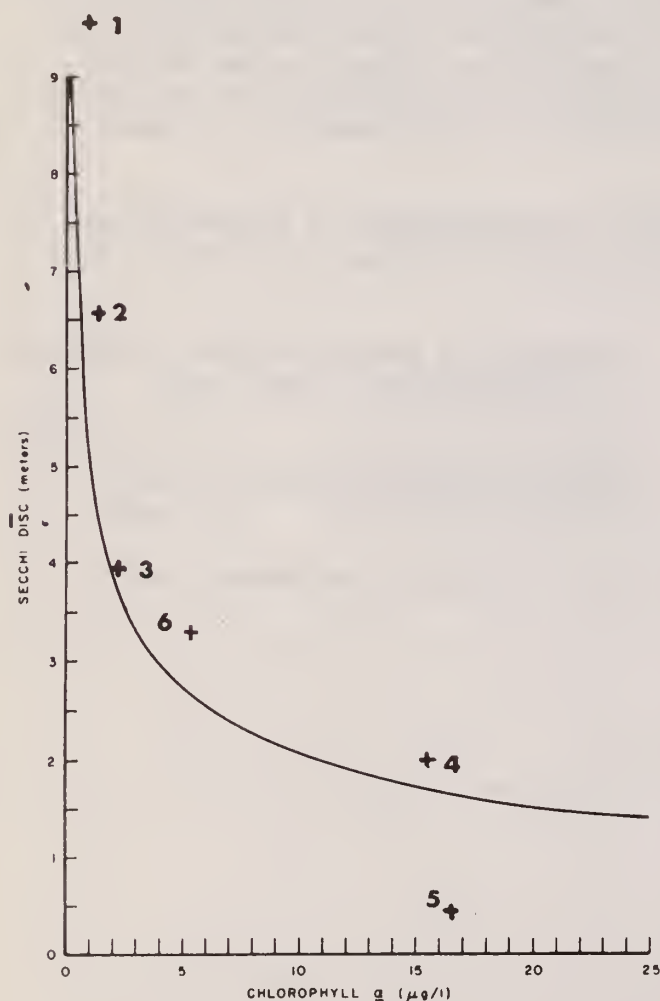
Date	Stn.	D1 S.D.	Chloro. <u>a</u>	Stn.	L1 S.D.	Chloro. <u>a</u>
June 24		3.0	3.7			
Aug. 12		4.0	5.0	3.5		3.9
" 19		3.25	6.8	3.0		7.0
Sept. 16		3.3	5.4	3.3		4.8
Oct. 8		3.5	4.8	3.0		5.0
Mean		<u>3.4</u>	<u>5.1</u>	<u>3.2</u>		<u>5.2</u>

The Secchi disc readings remained relatively constant at both sampling locations during the period sampled. The chlorophyll a concentrations exhibited a greater degree of variability. Based on the seasonal means for these two parameters, Kahshe Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and high densities of suspended algae. The difference in water quality between the two stations sampled is minimal.



Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Kahshe Lake in 1971, 1977 and 1979.

Year	Stn. S.D.	24 (LI) Chloro. <u>a</u>	Stn. S.D.	26 (DI) Chloro. <u>a</u>
1971	2.6	3.0	2.9	3.2
1972				
1973				
1974				
1975				
1976				
1977	3.2	- -	3.5	- -
1978				
1979	3.2	5.2	3.4	5.1
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Kahshe Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Kahshe Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph demonstrates the enrichment status of Kahshe Lake relative to a number of other Southern Ontario Lakes. While it is slightly more enriched than Balsam Lake, it is far removed from such highly enriched waterbodies as Lake Scugog. It is recommended that participation in this program be continued to determine any long term trends in the water quality of Kahshe Lake.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

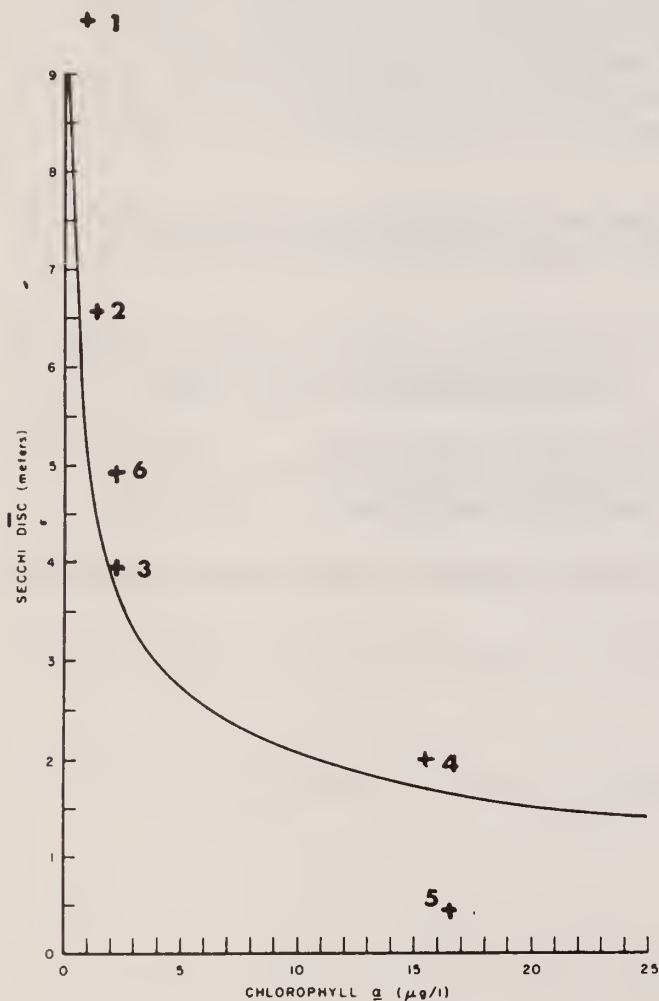
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Kashagawigamog Lake

Date	Stn. S.D.	1 (South) Chloro. <u>a</u>
July 15	2.4	2.6
July 22	4.3	3.6
July 29	5.8	3.0
Aug. 6	4.9	2.2
Aug. 12	5.2	2.1
Aug. 18	5.8	1.6
Sept. 3	6.1	1.2
Mean	<u>4.9</u>	<u>2.3</u>

The Secchi disc readings fluctuated considerably during the period sampled, ranging from 2.4 to 6.1 metres. The chlorophyll a concentrations were less variable, ranging from 1.2 to 3.6 ug/L. Based on the seasonal means for these two parameters, the southern portion of Kashagawigamog Lake would be considered to be between an unenriched and a moderately enriched lake. It is characterized by a moderately high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Kashagawigamog Lake from 1972 to 1979.

Year	Stn. S.D.	South Chloro. <u>a</u>	North S.D.	Chloro. <u>a</u>	
1971					
* 1972			4.2	4.7	
1973	4.5	1.7	4.6	2.0	
1974	4.2	1.5	4.4	1.4	
1975	5.2	1.1	4.9	1.7	
1976	4.5	1.3**	4.0	2.7	
1977	5.6	- -	4.9	- -	
1978	5.4	1.6	4.1	1.8	
1979	4.9	2.3		*	lake average
"				**	based on two samples



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Kashagawigamog Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Kashagawigamog Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The variation in the seasonal mean Secchi disc reading and chlorophyll a concentration between 1978 and 1979 is minimal, probably attributable to natural fluctuations. The overall condition of the southern portion of the lake appears stable and it is recommended that participation in this program be continued, to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentration (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4ug/l
unenriched	5 m or more	low algal densities	0-2ug/l

Table 1 on the attached page contains the Secchi disc chlorophyll a data collected from the seven stations monitored on Kawagama Lake in 1979. An insufficient number of samples were taken at Station 2 and 5 to allow any meaningful conclusions to be made.

Although there are trends apparent at individual stations in the fluctuations experienced by the two parameters monitored no overall lake trend is evident. Based on the seasonal means of the Secchi disc readings and chlorophyll a concentrations Kawagama Lake would be considered unenriched, characterized by a very high degree of water transparency and low densities of suspended algae. It remains one of the clearest, least productive lakes within the Central Region of the Ministry of the Environment.

There are station to station differences in the quality of the lake. Based on this year's data, Station 7 is the least enriched, followed by Stn.3, Stn.4, Stn.6, and Stn. 1, which is located in Minden Bay, the shallowest section of the lake, is the most enriched.

Table 2 on the attached page outlines the seasonal mean Secchi disc and chlorophyll a data collected between 1976 and 1979. No consistent lake wide trends are evident although there has been considerable yearly variation at some of the sampling locations. The condition of the lake appears stable and continued participation in this program is recommended to determine if this trend persists.

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Table 1: Secchi disc (m) and chlorophyll a (ug/l) data from Kawagama Lake - 1979

Date	Stn. 1 S.D. Chl. <u>a</u>	Stn. 2 S.D. Chl. <u>a</u>	Stn. 3 S.D. Chl. <u>a</u>	Stn. 4 S.D. Chl. <u>a</u>	Stn. 5 S.D. Chl. <u>a</u>	Stn. 6 S.D. Chl. <u>a</u>	Stn. 7 S.D. Chl. <u>a</u>
July 6							
8	5.0	1.8					9.2 1.5
15			9.1 0.9	11.0 1.0	9.1 1.4	5.8 2.3	8.5 1.0
22	6.1	1.6	9.1 1.1	9.75 0.7		5.0 1.7	10.0 1.0
29							
30			8.5 0.7	7.6 1.0	7.6 1.6	6.5	
Aug. 6		7.8 1.8	8.5 0.5				
12		7.5 3.1		8.5 - -		8.0 1.6	11.0 1.0
16							
19	4.9	4.2	11.3 0.8				9.4 0.9
26							
Sept. 4	4.4	6.0		6.0 2.3			
16				7.0 1.2			
30						5.5 2.4	
Oct. 8	4.7	3.4					
Mean	5.0	3.4	9.3 0.8	8.3 1.2	- - - -	6.2 2.0	9.6 1.1

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from 1976 to 1978

Year	Stn. 1 S.D. Chl. <u>a</u>	Stn. 2 S.D. Chl. <u>a</u>	Stn. 3 S.D. Chl. <u>a</u>	Stn. 4 S.D. Chl. <u>a</u>	Stn. 5 S.D. Chl. <u>a</u>	Stn. 6 S.D. Chl. <u>a</u>	Stn. 7 S.D. Chl. <u>a</u>
1976	4.5 2.5	7.2 1.6	9.6 1.0	10.1 1.0	9.5 1.1	7.1 1.4	9.5 1.3
1977	5.2	7.8	8.6	9.4	10.8	7.1	10.2
1978	5.5 2.9	7.9 1.6	- -	10.4 0.7	7.1 1.0	7.2 1.4	8.8 1.4
1979	5.0 3.4	- -	9.3 0.8	8.3 1.2	- -	6.2 2.0	9.6 1.1





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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

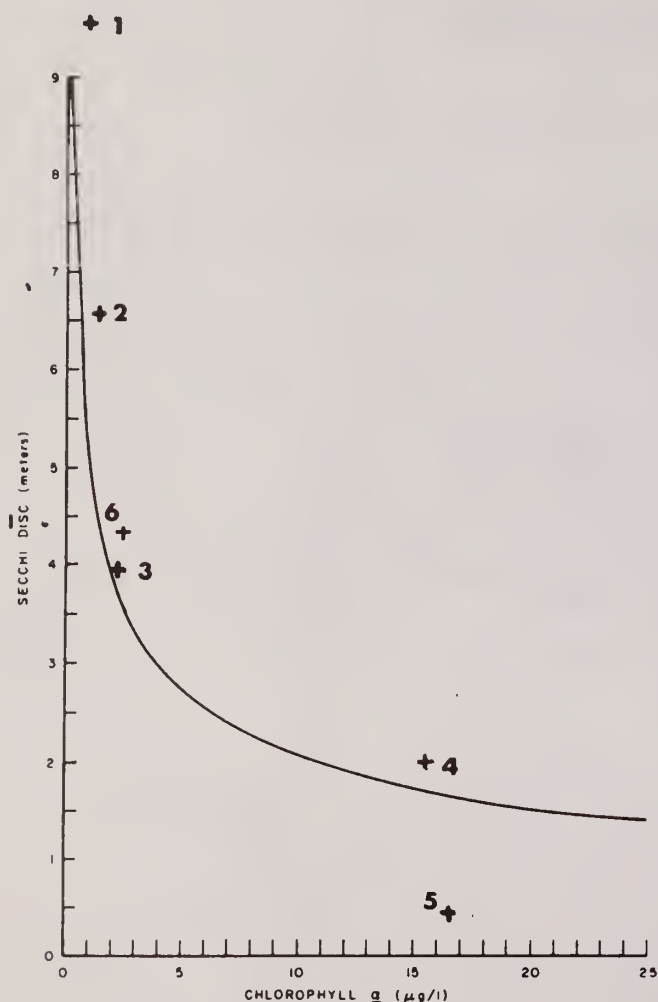
Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Kennaway Lake.

Date	Stn.	Main S.D.	Chloro. <u>a</u>	
May 21	4.5	2.5		The Secchi disc readings remained relatively constant during the period sampled, varying only between 3.75 and 4.75 metres. The chlorophyll <u>a</u> concentrations were more variable, ranging from 1.3 to 3.6 ug/L. No trends are apparent in the fluctuations experienced by either of these two parameters. Based on the seasonal means of these two parameters, Kennaway Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and moderately low densities of suspended algae.
May 27	4.5	1.7		
June 3	4.5	1.3		
June 10	3.75	2.2		
June 17	3.75	2.0		
June 24	4.0	1.8		
July 2	4.0	2.0		
July 8	4.25	1.9		
July 15	4.25	2.0		
July 22	3.75	2.6		
July 29	4.0	2.9		
Aug. 6	4.5	3.4		
Aug. 12	4.5	3.0		
Aug. 19	4.75	2.5		
Aug. 26	4.5	3.2		
Sept. 03	4.5	3.6		
Mean	4.3	2.4		

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Kennaway Lake from 1973 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973	4.1	3.3
1974	3.6	1.9
1975	3.8	2.7
1976	4.2	3.8
1977	4.7	- -
1978	3.6	2.4
1979	4.3	2.4
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Kennaway Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Kennaway Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

It is evident from the historical record of seasonal mean Secchi disc readings and chlorophyll a concentrations that the overall condition of Kennaway Lake is stable. The year to year variations in these parameters are attributable to natural fluctuations. It is recommended that participation in this program be continued to monitor future water quality trends.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

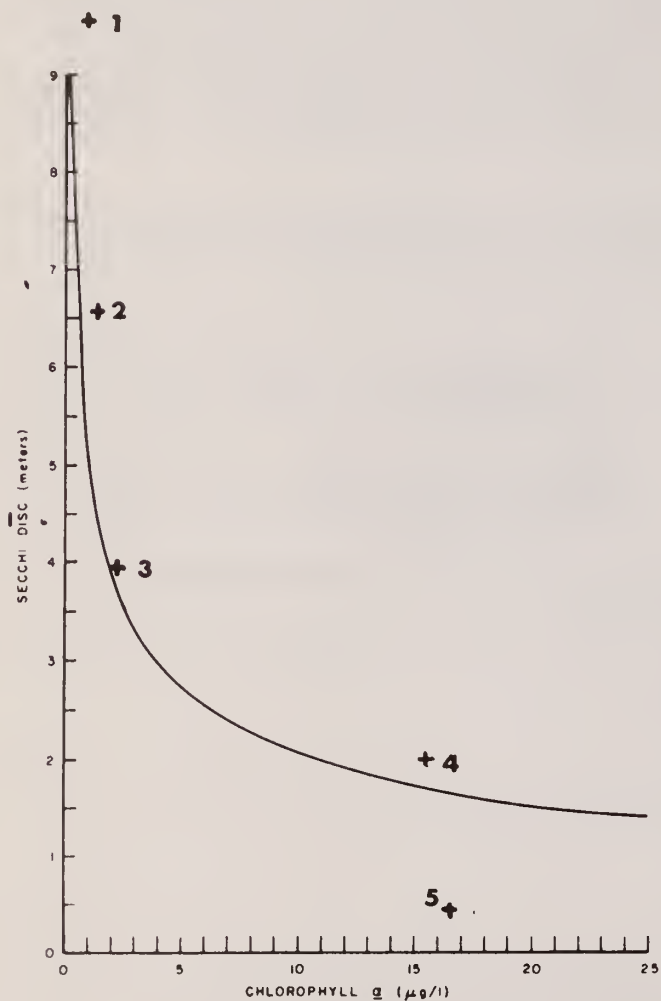
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from KOSHLONG LAKE.

Date	Stn. S.D.	A Chloro. <u>a</u>
Aug.	4.1	2.3

Insufficient data was collected, to allow any meaningful conclusion to be made.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Koshlong Lake from 1973 to 1977 and 1979.

	Stn.	
Year	S.D.	Chloro. <u>a</u>
1971		
1972		
1973	5.7	2.0
1974	5.4	1.3
1975	6.5	1.9
1976	5.7	2.2
1977	7.2	- -
1978	- -	- -
1979	- -	- -
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972

Figure 1: The relationship between Secchi disc and chlorophyll a for Koshlong Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to be continued, the sampling frequency must be increased in order to obtain meaningful data.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1 on the attached page contains the Secchi disc and chlorophyll a data collected from the seven stations monitored in 1979. Station 4 was sampled an insufficient number of times to enable any conclusions to be made.

No overall trends are evident in the variations experienced by either the Secchi disc readings or chlorophyll a concentrations. Based on the seasonal mean value for these two parameters, Lake of Bays would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae. The overall status of the lake is comparable to that of Lake Joseph, a very clear, unproductive lake.

The station to station variations in water quality this year were minimal. The quality of the lake in the vicinity of Station 2, 5, 6, 7 & 10 was similar. The lake in the vicinity of Station 12 was slightly more enriched.

Table 2 on the attached page summarizes the seasonal mean Secchi disc and chlorophyll a data collected between 1977 and 1979. The degree of transparency measured in 1979 was less, at every station, than that measured in 1978. The difference however was within the range of variation normally attributed to natural fluctuations. The overall status of the lake appears stable. Continued participation in this program is recommended, in order to monitor future water quality trends.

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Table 1: Secchi disc (m) and Chlorophyll a (ug/l) data for Lake of Bays - 1979

Date	Stn. 2		Stn. 4		Stn. 5		Stn. 6		Stn. 7		Stn. 10		Stn. 12	
	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a
May 28	6.0	1.5	7.5	1.1	7.0	0.9	6.5	1.2	6.5	1.1	6.0	1.7	6.0	1.1
July 1	7.0	0.8			7.5	1.1	7.0	1.2	7.0	1.0	7.0	1.0	6.0	0.9
July 21	-	1.4			-	1.2	-	1.5	-	-	-	1.2	-	1.2
Aug. 6	6.0	2.2			6.75	1.7	6.6	2.5	8.1	-	6.75	2.2	6.0	2.9
Aug. 19	5.5	2.5			6.4	1.7	5.9	3.1	5.0	0.6	5.0	1.6	4.6	1.6
Sept. 3	6.5	1.4			6.5	1.7	6.5	1.9	6.5	-	7.5	-	7.0	1.4
Oct. 8	6.0	2.2			5.5	2.6	5.0	2.5	5.0	2.3	5.0	2.0	4.0	1.6
Mean	6.2	1.7	-	-	6.6	1.6	6.3	2.0	6.4	1.3	6.2	1.6	5.6	1.5

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected in 1977 to 1979

Year	Stn 2		Stn. 4		Stn. 5		Stn. 6		Stn. 7		Stn. 10		Stn. 12	
	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a	S.D.	Chl. a
1977	7.5		6.5		7.0		6.3		7.4		6.1		6.5	
1978	8.0	1.3	6.2	1.0	7.2	1.3	7.1	1.5	6.9	1.1	7.4	1.7	6.0	1.2
1979	6.2	1.7	-	-	6.6	1.6	6.3	2.0	6.4	1.3	6.2	1.6	5.6	1.5





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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

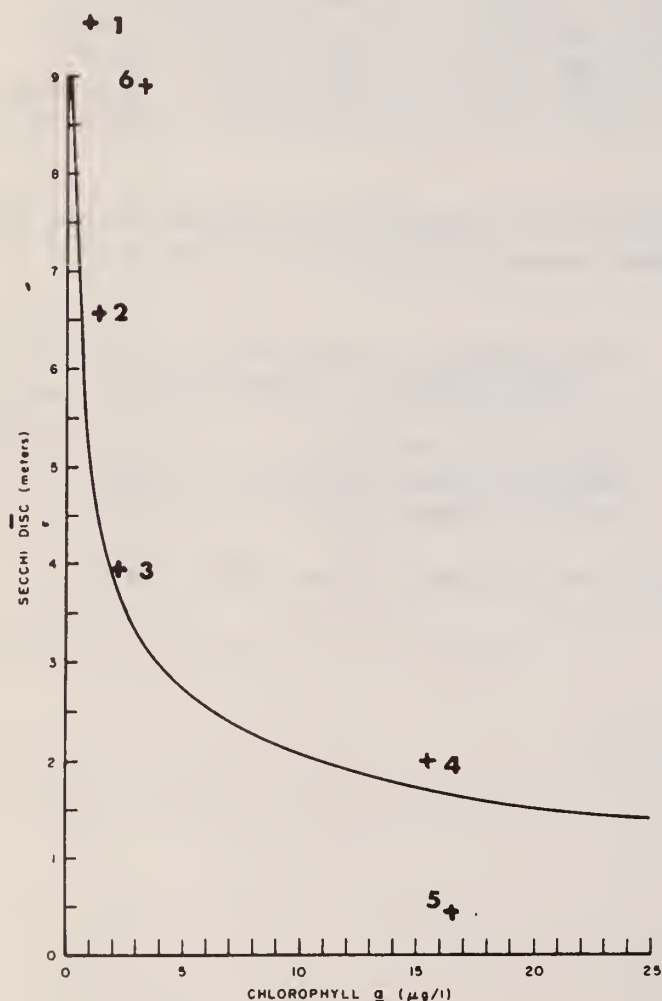
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Lake Joseph.

Date	Stn. S.D.	A Chloro. <u>a</u>	Stn.B S.D.	Chloro <u>a</u>
July 9	9.3	- -	9.3	- -
July 19	10.2	2.6	10.2	2.4
July 27	9.4	- -	9.5	- -
Aug. 3	8.4	- -	7.9	- -
Aug. 12	7.0	- -	7.0	- -
Aug. 19	7.0	4.9	7.0	2.8
Aug. 31	8.5	- -	8.5	- -
Sept. 6	8.0	1.7	8.0	2.5
Mean	8.5	3.6	9.3	2.6

The maximum Secchi disc reading was recorded on July 19 at both stations; the minimum readings were recorded in mid-August, corresponding to the maximum chlorophyll a concentrations. Based on the seasonal means of these two parameters Lake Joseph would be considered unenriched, characterized by a very high degree of water transparency. The difference in water quality between the two stations is minimal.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Lake Joseph from 1970 to 1979.

Year	Stn. - J7		Stn. - J8		Stn. - A (Hallam)		Stn. B (Hallam)	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
*1970	8.1	1.0	5.8	2.5				
1971								
1972								
1973								
1974	7.0	0.5						
1975								
1976	8.2	1.4	6.2	2.2				
1977	8.3		6.2		8.4	- -	8.6	- -
1978	- -	- -	- -	- -	8.4	1.1	8.5	1.1
1979					8.5	3.6	9.3	2.6
* "	MOE data							



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Lake Joseph - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Lake Joseph and a number of other well-known recreational lakes in the province. All data are seasonal means.

The seasonal mean Secchi disc readings at the two stations (Hallam A & B) have experienced only minor variations in the past three years which are attributable to natural fluctuations. Because chlorophyll a samples could be obtained on only three occasions in 1979, it is difficult to discern whether there was an actual increase in the lake's algal density in 1979. The available data indicates that the overall condition of Lake Joseph is stable.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Lake St. John.

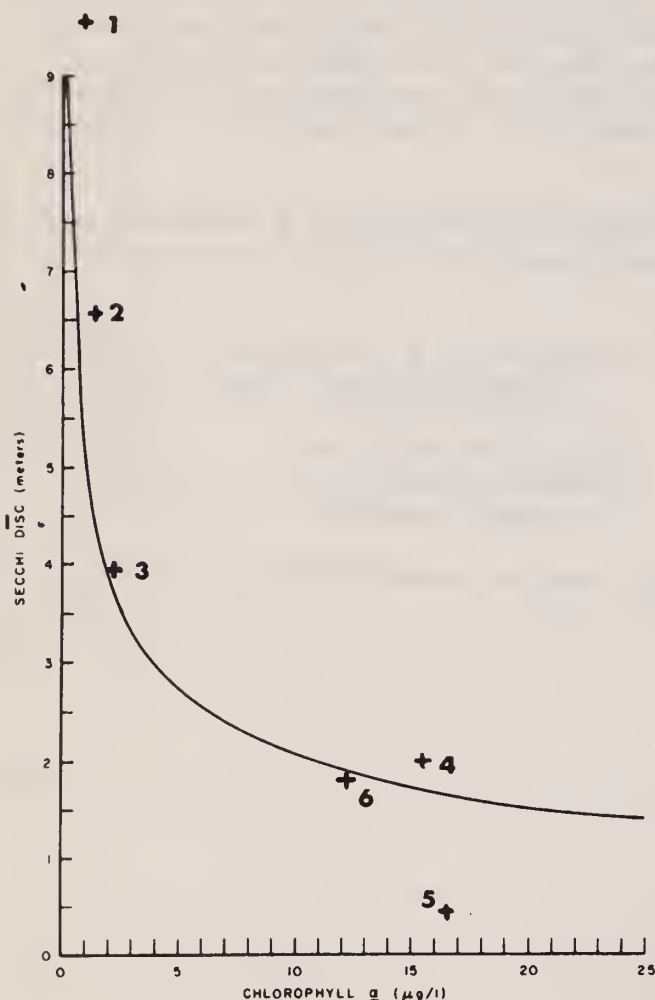
Date	Stn. S.D.	Main Chloro. <u>a</u>
May 27	3.0	1.3
June 5	3.7	3.0
June 11	2.7	3.8
June 17	3.7	6.1
July 2	--	9.6
July 8	1.3	9.4
July 15	1.75	3.1
July 21	1.5	5.6
July 28	1.0	25.4
Aug. 4	1.0	- -
Aug. 12	0.9	37.0
Sept. 23	1.0	35.5
Oct. 8	1.5	5.3
Mean	<u>1.9</u>	<u>12.1</u>

The maximum Secchi disc readings were recorded in late May and the first half of June. The minimum readings were taken during the later portion of the sampling period, corresponding to the highest chlorophyll a concentrations. The chlorophyll a data indicates that lake St. John experienced an algae bloom which started in late July and persisted to approximately the end of September. Based on the seasonal means for the two parameters monitored Lake St. John would be considered enriched, characterized by a poor degree of water transparency and very high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Lake St. John in 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
------	-----------	-----------------------

1971		
1972		
1973		
1974		
1975		
1976		
1977		
1978		
1979	1.9	12.1
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Lake St. John - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Lake St. John and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph illustrates the enrichment status of Lake St. John relative to a number of other Southern Ontario Lakes. The status of the lake is comparable to that of MacLean Lake, another enriched waterbody. Continued participation in this program is required to determine any long-term trends in the quality of Lake St. John.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Lake Vernon.

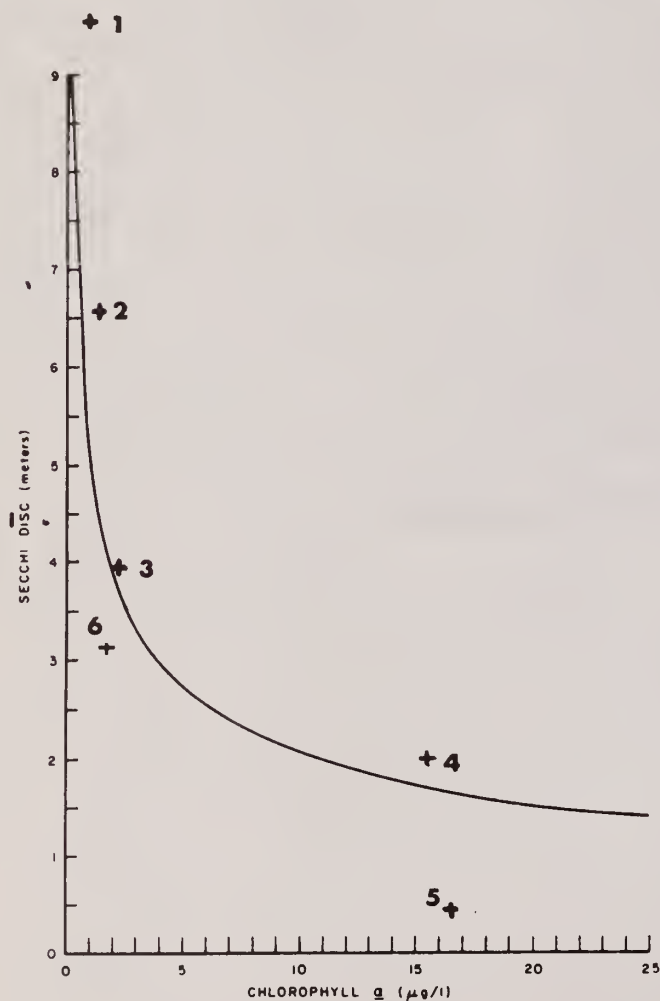
Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
July 22	3.0	2.3
Aug. 12	3.8	1.4
Aug. 19	3.3	1.4
Aug. 26	3.5	1.9
Sept. 9	2.6	2.1
Mean	<u>3.2</u>	<u>1.8</u>

The Secchi disc reading varied from 2.6 to 3.8 metres and the chlorophyll a concentration ranged from 1.4 to 2.3 ug/L during the period sampled. No trends are apparent in the fluctuations experienced by either of these parameters. Based on the seasonal means of these parameters, Lake Vernon would be considered moderately enriched, characterized by a moderate degree of water transparency and low densities of suspended algae. The colouration of Lake Vernon results in a lower degree of water transparency, than would be encountered in a clear water lake having similar algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Lake Vernon in 1974, 1975, 1977 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
* 1974	4.0	0.7
1975	2.9	1.8
1976	- -	- -
1977	3.7	- -
1978	3.2	1.6
1979	3.2	1.8

\* Based on one sampling.



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Lake Vernon - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Lake Vernon and a number of other well-known recreational lakes in the province. All data are seasonal means.

The 1978 & 1979 season mean Secchi disc readings are identical and there is only a minimal variation in the chlorophyll a concentration. Based on the available data, the status of Lake Vernon appears stable. Continued participation in this program is recommended to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.)  
(metres - m)

Chlorophyll a concentrations (Chloro. a)  
(micrograms per litre - ug/l)

enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

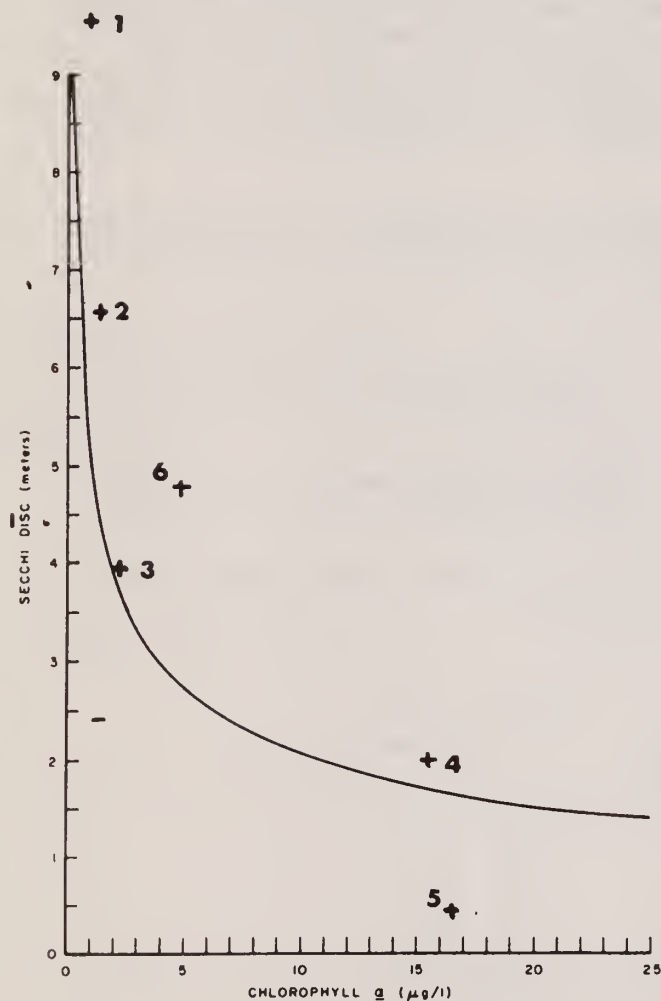
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Leech Lake.

Date	Stn.	N. Bay	Stn.	E. Bay	Stn. W. Bay
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D. Chloro. <u>a</u>
June 3	5.0	1.8	4.5	2.0	4.5 2.7
July 8	3.0	6.9	3.5	8.1	3.5 9.9
July 15	4.5	5.6	4.25	5.3	4.0 6.6
July 22	5.5	2.5	5.25	2.8	6.2 7.1
Aug. 6	5.25	3.0	5.0	4.2	6.0 10.5
Aug. 26	4.50	4.1	5.0	4.9	5.25 5.9
Sept. 4	5.75	5.0	6.0	-	5.75 6.1
Sept. 22	4.0	3.4	4.5	4.3	4.75 4.0
Mean	4.6	4.0	4.8	4.5	5.0 6.5

Based on the seasonal mean Secchi disc readings and chlorophyll a concentrations, Leech Lake would be considered enriched, characterized by high densities of suspended algae and a moderately high degree of water transparency. The transparency of Leech Lake is considerably greater than normally encountered in lakes having similar densities of suspended algae. A possible explanation for this is that the algae is concentrated in a narrow layer at a depth greater than the Secchi disc depth, rather than being distributed through the water column as is normal. The algae therefore exert a minimal influence on the degree of water transparency, instead of a major controlling factor. The variation in water quality between the three stations sampled is minor.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Leech Lake from 1977 to 1979.

Year	Stn. -A (N.Bay)		Stn. - B (E. Bay)		Stn. C (W. Bay)	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
1971						
1972						
1973						
1974						
1975						
1976						
1977	5.4	- -	5.0	- -	5.4	- -
1978	3.8	4.5	4.1	4.4	4.0	5.1
1979	4.6	4.0	4.8	4.5	5.0	6.5
"						



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Leech Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Leech Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The yearly variations in the seasonal mean Secchi disc readings and chlorophyll a concentrations recorded to date, follow no distinct trend, and are within the range normally attributed to natural fluctuations. Based on the available data, the status of Leech Lake appears stable. It is recommended that participation in this program be continued, to determine if this condition persists.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

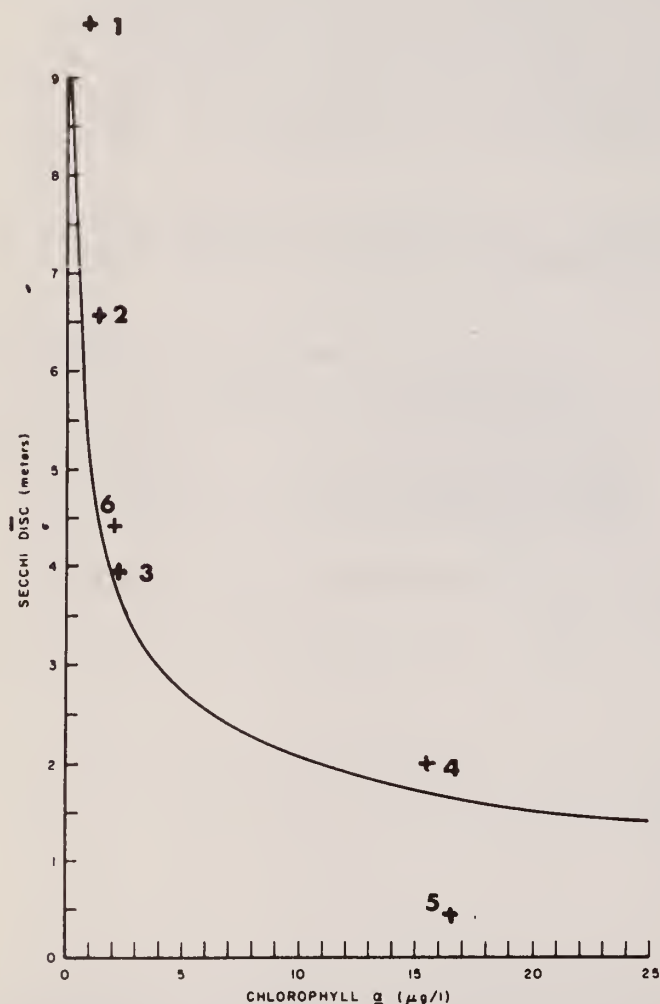
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Leonard Lake.

Date	Stn.	Centre Lake S.D.	Chloro. <u>a</u>
July	2	4.0	3.4
July	9	4.0	2.1
Aug.	9	3.5	2.1
Sept.	3	6.0	1.6
Mean		4.4	2.3

Since samples were collected on only four occasions in 1979, it is difficult to obtain even a reasonably accurate assessment of Leonard Lake's trophic status. Based on the available data, the lake would be considered moderately enriched, characterized by a moderate degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Leonard Lake in 1971, 1975 to 1977 and 1979.

Year	Stn. S.D.	-A (N.Bay) Chloro. <u>a</u>	Stn. S.D.	- B (S.Bay)	
*1971	5.3	1.8			
1972					
1973					
1974					
1975	5.3	1.5			
1976	6.5	1.7**			
1977	6.0	- -	5.2	- -	* MOE data
1978	- -	- -			** based on one sampling
1979	4.4	2.3			
"					



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Leonard Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Leonard Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Whether there has been a change in the trophic status of Leonard Lake, cannot be determined from the available data. It is recommended that participation in this program be continued with a greater sampling frequency.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Little Hawk Lake.

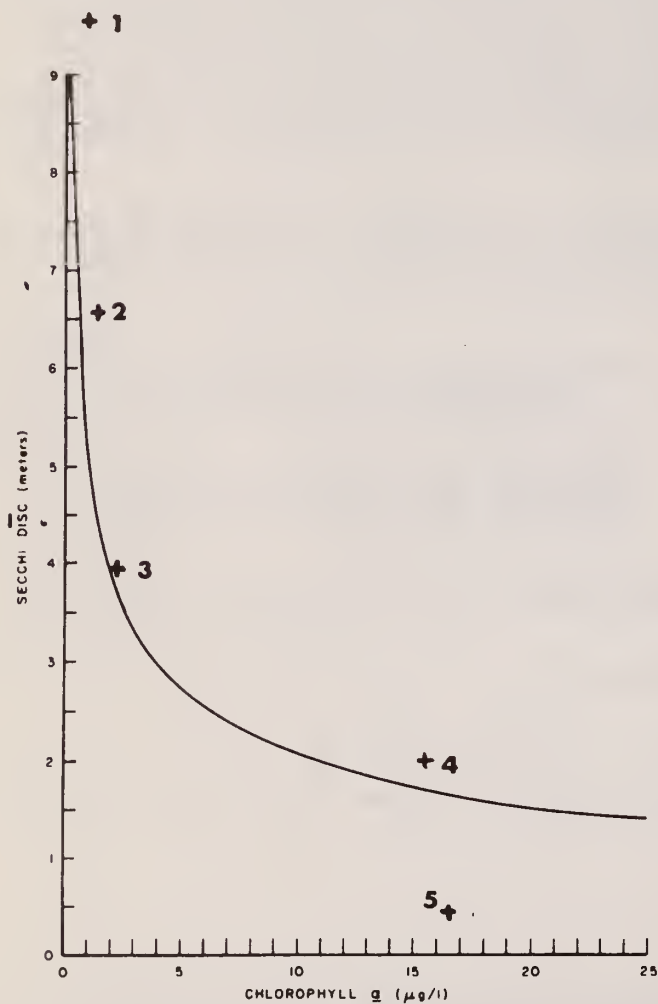
Date	Stn. S.D.	1 Chloro. <u>a</u>	Stn. S.D.	2 Chloro. <u>a</u>	Stn. S.D.	3 Chloro. <u>a</u>
Aug. 12	9.0	1.7	10.25	1.5	9.0	1.9

Insufficient data was collected to allow any meaningful conclusions to be reached.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from

Year	Stn.	S.D.	Chloro. <u>a</u>
------	------	------	------------------

1971
1972
1973
1974
1975
1976
1977
1978
1979
"



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972

Figure 1: The relationship between Secchi disc and chlorophyll a for and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to continue the sampling frequency must be increased in order that meaningful data may be obtained.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

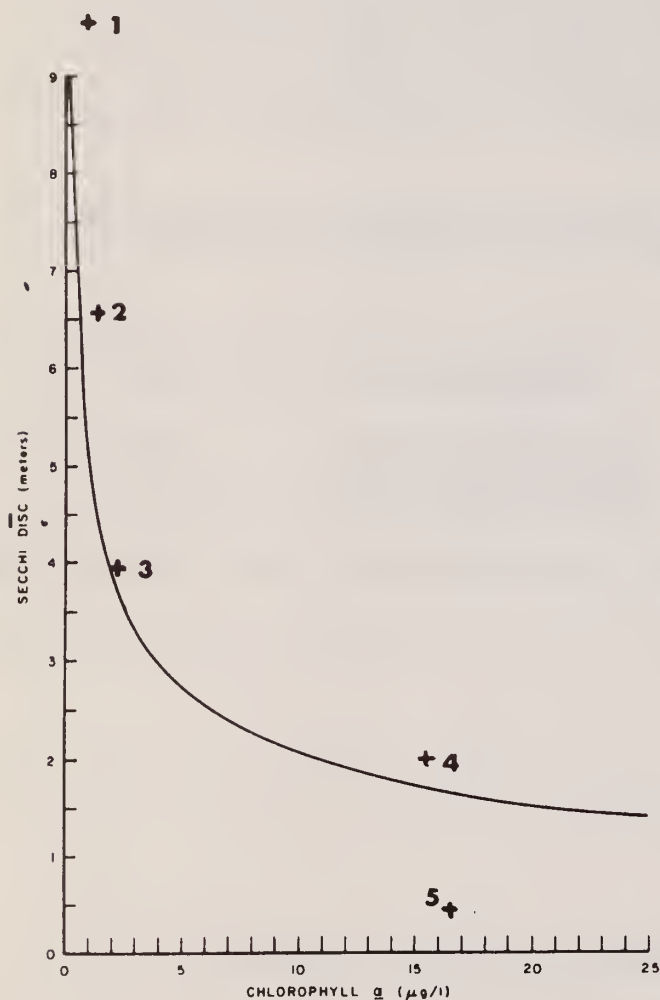
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Little Kennisis Lake

Date	Stn. S.D.	Main Chloro. <u>a</u>
Aug. 6	5.5	1.9
Sept. 16	6.5	1.6
Mean	6.0	1.8

Insufficient data was collected to allow any meaningful conclusions to be made.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Little Kennisis Lake from 1972 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972	4.5	1.6
1973	4.8	1.1
1974	5.3	1.1
1975	5.5	1.0
1976	5.3	2.0
1977	6.3	- -
1978	5.5	1.4
1979	- -	- -
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972

Figure 1: The relationship between Secchi disc and chlorophyll a for and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to continue, the sampling frequency must be increased if meaningful data is to be obtained.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

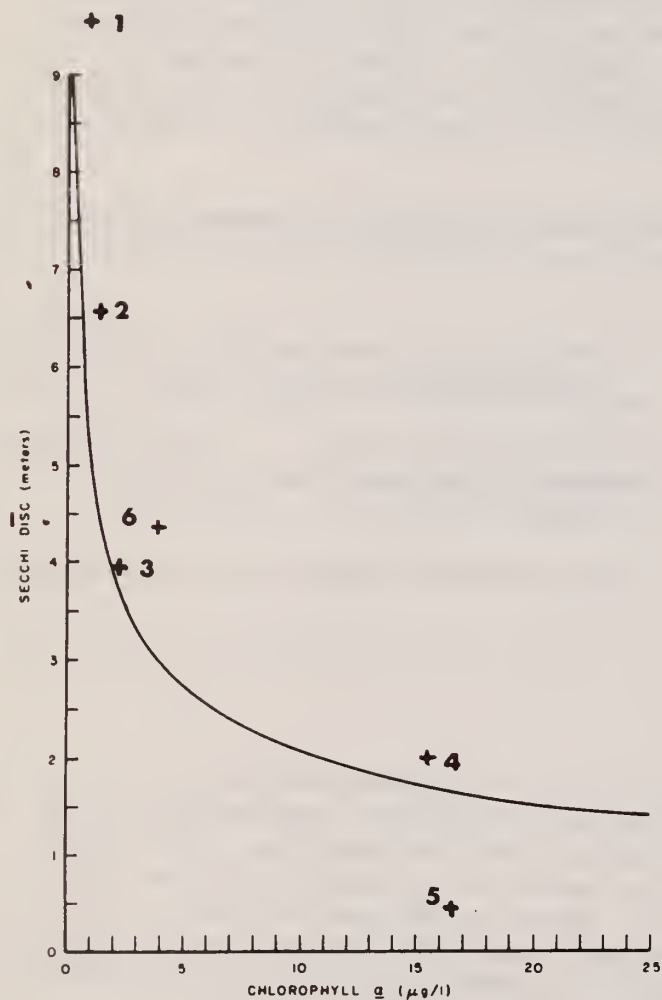
Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
enriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Little Straggle Lake

Date	Stn.	Main	
	S.D.	Chloro. <u>a</u>	
May 21	4.25	5.1	The Secchi disc readings were in general greater during the later half of the sampling period, and less variable. The largest chlorophyll <u>a</u> concentrations were measured during the first half of the sampling period. Based on the seasonal means of these two parameters, Little Straggle Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and moderately high densities of suspended algae.
May 27	4.50	4.6	
June 3	4.0	3.7	
June 10	3.5	4.1	
June 17	4.0	5.3	
June 24	3.5	4.9	
July 2	3.75	3.8	
July 8	- --	4.7	
July 15	4.5	4.4	
July 19	5.0	2.9	
July 22	4.5	4.5	
Aug. 7	4.5	3.4	
Aug. 12	4.5	4.2	
Aug. 19	4.5	2.1	
Aug. 26	4.5	2.9	
Sept. 3	4.25	3.0	
Mean	4.3	4.0	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Little Straggle Lake from 1973 to 1979.

Stn. - Main		
Year	S.D.	Chloro. <u>a</u>
1971		
1972		
1973	3.8	2.9
1974	3.6	1.6
1975	5.3	2.4
1976	4.1	2.2
1977	5.3	- -
1978	4.6	2.4
1979	4.3	4.0



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Little Straggle Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Little Straggle Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Whereas the 1979 seasonal mean Secchi disc reading is within the range of readings previously recorded on Little Straggle Lake, the seasonal mean chlorophyll a concentration is higher. This is not thought to represent a change in the status of the lake, but it is recommended that participation in this program be continued, in order to examine future trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

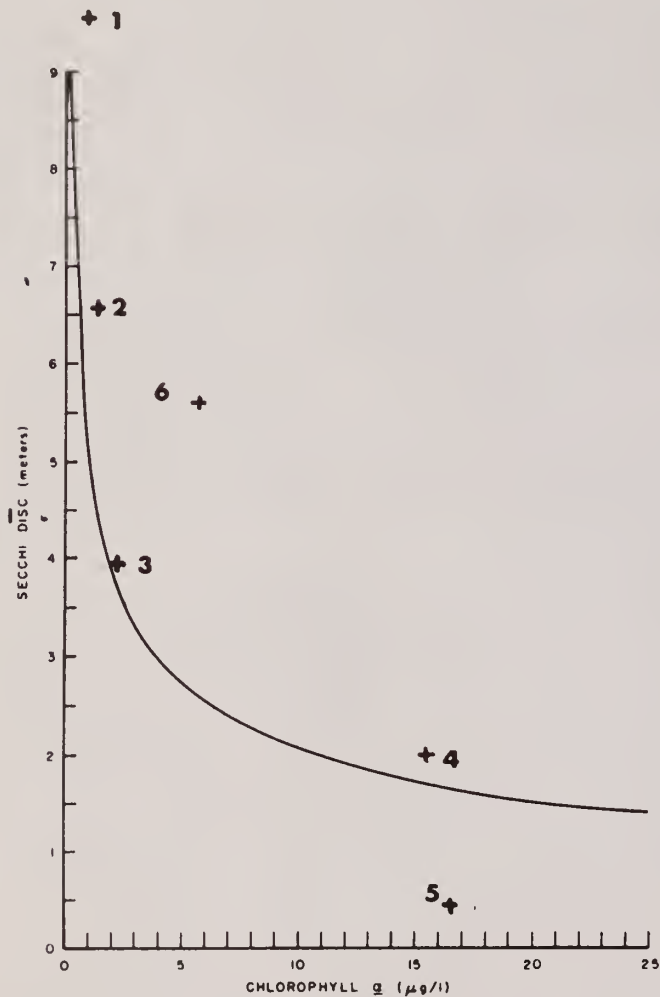
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Long Lake

Date	Stn.	l Main
	S.D.	Chloro. <u>a</u>
May 21	4.5	7.2
May 27	5.0	5.8
June 3	5.5	4.3
June 16	- -	- -
June 17	5.5	4.8
June 23	6.5	5.6
July 8	5.5	8.4
Aug. 19	7.0	4.1
Mean	<u>5.6</u>	<u>5.7</u>

Based on the seasonal means for the two parameters sampled, Long Lake is characterized by a high degree of water transparency and high densities of suspended algae. The transparency of Long Lake is considerably greater than normally encountered in Lakes having similar densities of suspended algae. A possible explanation for this, is that the algae is concentrated in a narrow layer at a depth greater than the Secchi disc depth, rather than being distributed through the water column as is normal. The algae therefore exert a minimal influence on the degree of water transparency, instead of being a major controlling factor.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Long Lake for 1977, 1978 and 1979.

Year	Stn. -1 S.D. Chloro. <u>a</u>	Stn. -2 S.D. Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977	5.6 - -	6.1 - -
1978	6.3 5.0	5.7 4.3
1979	5.6 5.7	- - - -
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Long Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Long Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The yearly seasonal mean Secchi disc readings and chlorophyll a concentrations have experienced only minor fluctuations, indicating a stable lake condition. Continued participation in this program is recommended to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

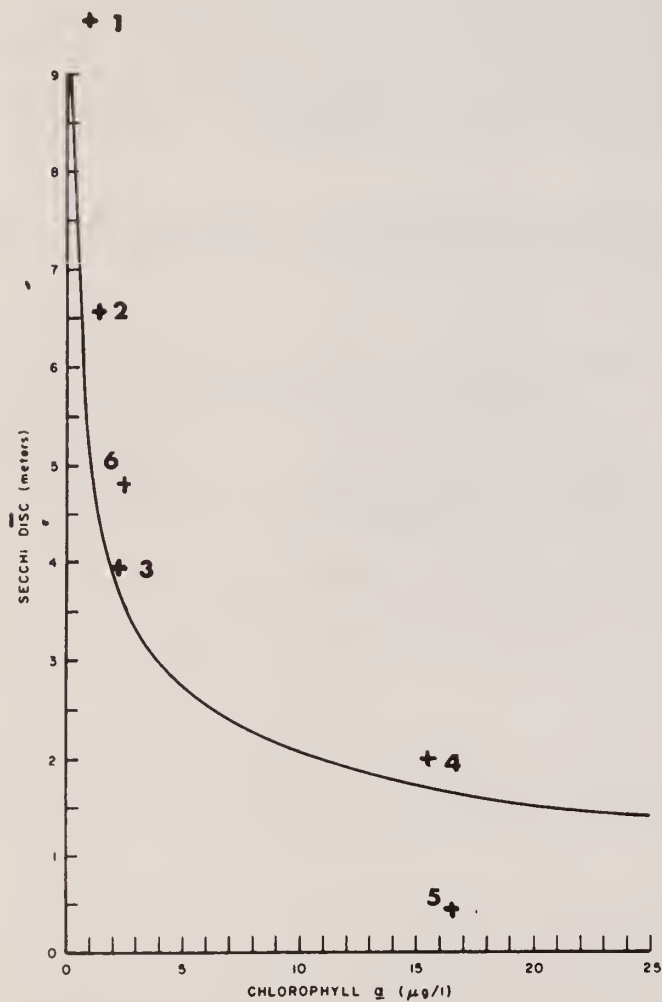
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Long Lake.

Date	Stn. S.D.	Main Chloro. <u>a</u>
May 20	4.25	3.9
July 1	5.4	1.5
June 16	4.6	3.5
Aug. 6	4.5	3.0
Sept. 2	5.0	1.7
Mean	<u>4.8</u>	<u>2.7</u>

The Secchi disc readings remained relatively constant during the period sampled, ranging from 4.25 to 5.4 metres. The chlorophyll a concentrations were more variable, ranging from 1.5 to 3.9 ug/L. Based on the seasonal means of these two parameters, Long Lake would be considered moderately enriched, characterized by a moderately high degree of water transparency and moderate densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Long Lake from 1976 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976	3.8	2.3
1977	3.8	- -
1978	4.0	1.8
1979	4.8	2.7
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Long Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Long Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The 1979 seasonal mean Secchi disc reading is greater than at recorded in previous years. The mean chlorophyll a concentration is also higher than that measured in previous years. This is not thought to represent an alteration in the quality of Long Lake, it is recommended that participation in this program be continued in order that future water quality trends may be monitored.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

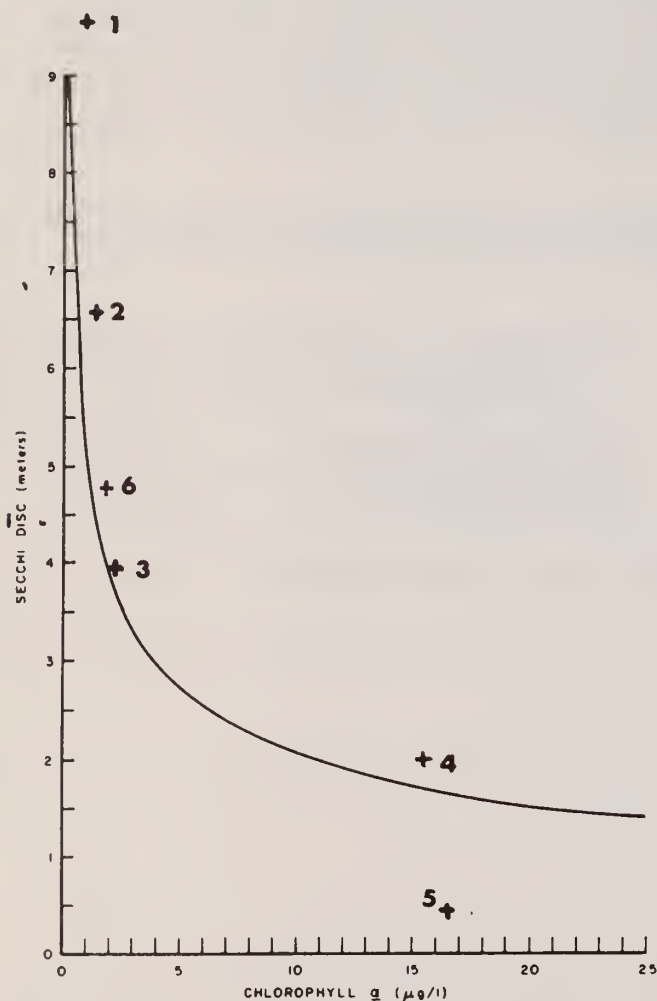
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Loon Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
May 21	4.5	1.3
June 10	5.25	1.0
June 24	4.6	1.8
July 2	4.25	2.4
July 15	4.1	2.6
July 29	4.75	2.4
Aug. 12	5.25	1.8
Sept. 2	5.75	1.1
Mean	4.8	1.8

The Secchi disc reading varied from 4.1 to 5.75 metres and the chlorophyll a concentration ranged from 1.1 to 2.6 ug/L during the period sampled. No trends are evident in the variations experienced by either of these parameters. Based on the seasonal means of these parameters, Loon Lake would be considered to be between an unenriched and a moderately enriched lake. The lake is characterized by a moderately high degree of water transparency and low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Loon Lake for 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977		
1978		
1979	4.8	1.8
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Loon Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Loon Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph illustrate the enrichment status of Loon Lake relative to a number of other Southern Ontario Lakes. The Lake is approximately midway between Twelve Mile Lake, an unenriched lake and Balsam Lake, a moderately enriched water body. Continued participation in this program is required to identify any long-term trends in water quality.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Looncall Lake.

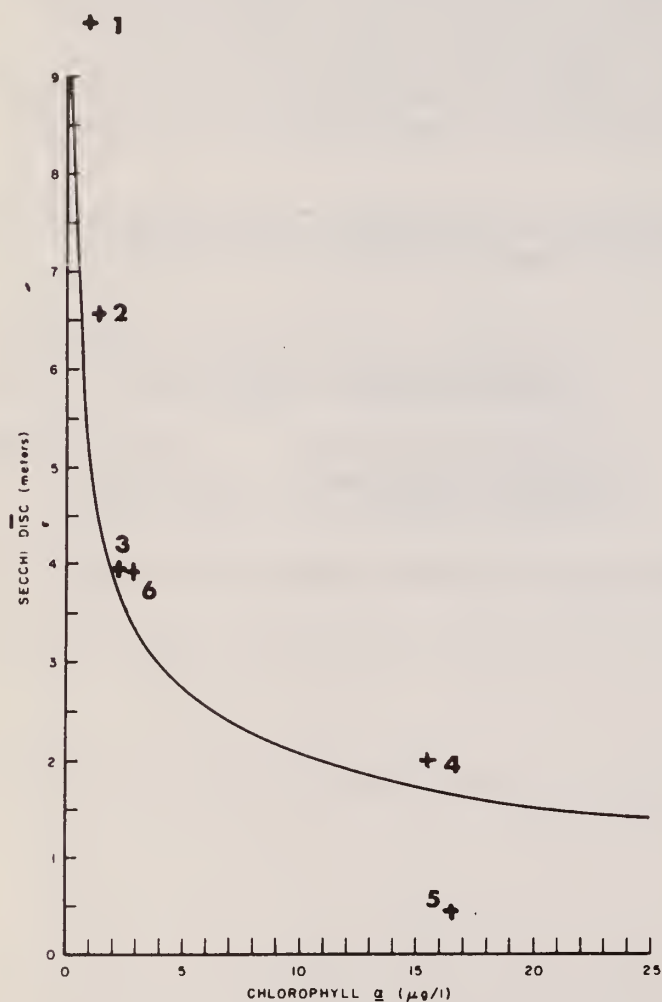
Date	Stn.	23 S.D.	Chloro. <u>a</u>
May 16	4.0	1.9	
May 31	4.5	1.1	
June 13	3.5	4.8	
June 28	4.0	3.8	
July 10	3.0	3.7	
July 19	4.0	1.9	
July 27	4.0	2.4	
Aug. 14	3.0	2.7	
Aug. 29	4.0	4.5	
Sept. 12	4.0	4.6	
Sept. 24	4.0	2.4	
Oct. 2	4.0	3.6	
Oct. 18	5.0	1.2	
Mean	3.9	3.0	

An excellent sampling program was carried out on the lake during 1979. Individual Secchi disc measurements did not correspond very well to chlorophyll a concentrations. A possible explanation for this is that algae may not have been evenly distributed through the water column. Based on mean values for the two parameters Looncall Lake is considered moderately enriched with moderate algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Looncall Lake from 1971 to 1979.

Year	Stn. S.D.	West End Chloro. <u>a</u>	Stn. S.D.	East End Chloro. <u>a</u>
*1971	4.5	1.5		
1972				
1973				
*1974	3.4	1.6		
*1975	3.5	1.6		
*1976	3.2	3.9		
1977	4.2	- -	5.5	
1978	4.0	1.1		
1979	3.9	3.0		
"				

\* Main Lake Station



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Looncall Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Looncall Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Continued participation in the sampling program is encouraged to ensure that long-term changes in enrichment status can be defined.

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The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

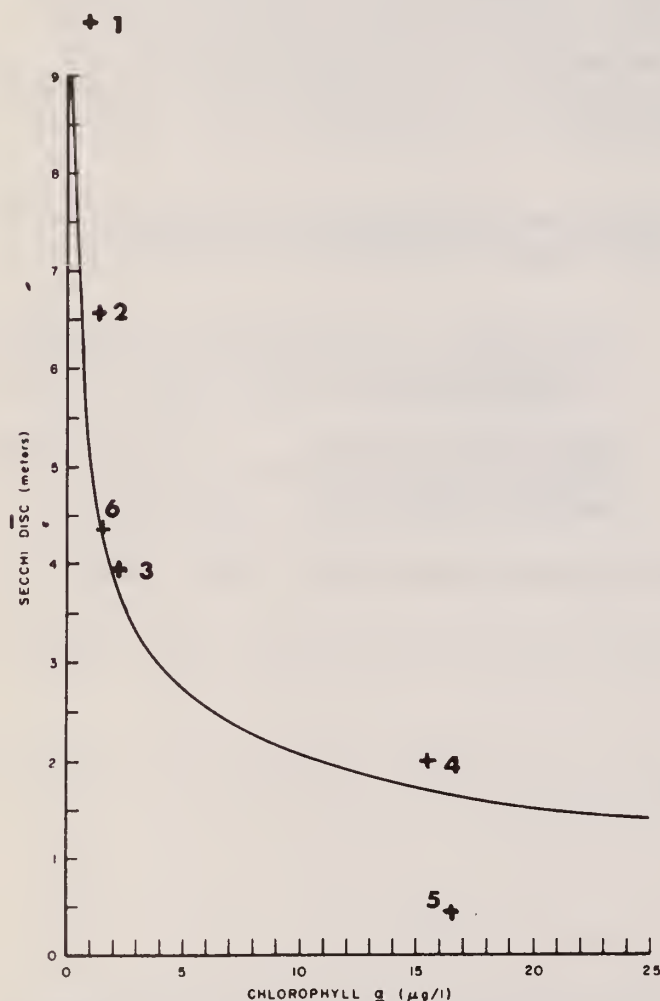
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Mary Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
July 23	4.0	1.8
Aug. 13	4.0	1.8
Aug. 19	4.5	1.6
Aug. 27	4.5	1.4
Sept. 9	4.5	1.7
Mean	<u>4.3</u>	<u>1.6</u>

Both the Secchi disc readings and chlorophyll a concentrations remained almost constant during the period sampled; values ranged from 4.0 to 4.5 metres and 1.4 to 1.8 ug/L respectively. Based on the seasonal means of these two parameters, Mary Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Mary Lake from 1974 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974	4.5	1.7
1975	3.8	1.7
1976	4.1	2.3
1977	4.3	- -
1978	4.2	2.5
1979	4.3	1.6
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Mary Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Mary Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The decrease in the 1979 seasonal mean chlorophyll a concentration is attributable to natural fluctuation and not an actual change in the quality of the lake. The overall status of Mary Lake appears stable. Continued participation in this program is recommended to determine if this trend persists.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

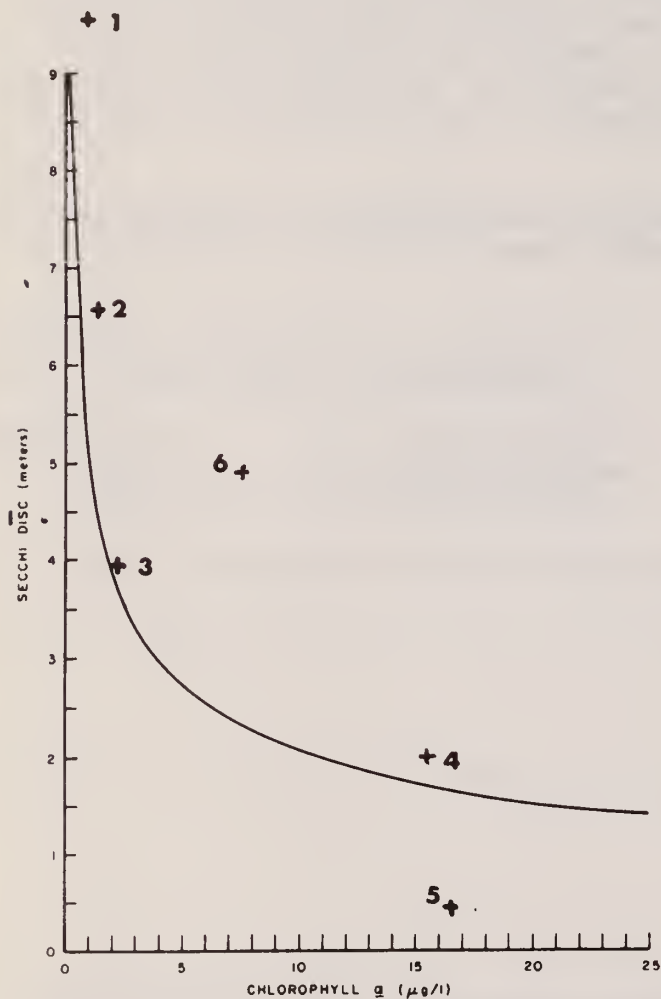
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Medora Lake.

Date	Stn. S.D.	South Central Chloro. <u>a</u>
July 29	9.0	6.5
Aug. 16	3.5	9.9
Aug. 30	4.0	8.4
Sept. 23	3.0	3.4
Mean	4.9	7.1

Since Medora Lake was sampled on only four occasions in 1979, it is difficult to obtain even a reasonably accurate assessment of the lake's trophic status. Based on the seasonal means for the two parameters monitored, Medora Lake is characterized by a moderate degree of water transparency and high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Medora Lake from 1974 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974	3.7	2.0
1975	4.1	9.0
1976	- -	- -
1977	4.1	- -
1978	3.6	3.3
1979	4.9	7.1
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Medora Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Medora Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The 1979 data base is insufficient to base conclusions on regarding year to year trends in the quality of Medora Lake. If participation in this program is continued, the sampling frequency must be increased in order to obtain meaningful data.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.)  
(metres - m)

Chlorophyll a concentrations (Chloro. a)  
(micrograms per litre - ug/l)

enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Miskwabi Lake.

Date	Stn. 6 S.D.	Chloro. <u>a</u>	Stn. 13 S.D.	Chloro. <u>a</u>
May 21	- -	- -	4.0	2.5
June 3	6.5	1.4	5.25	1.6
June 10	- -	- -	5.0	0.9
June 24	6.5	1.7	- -	- -
July 8	6.5	1.9	5.25	2.6
July 15	- -	- -	5.0	1.9
July 22	- -	- -	6.25	1.7
July 29	7.0	1.7	6.25	2.4
Aug. 6	- -	- -	6.5	- -
Sept. 3	- -	- -	6.0	2.1
Mean	<u>6.6</u>	<u>1.7</u>	<u>5.6</u>	<u>2.0</u>

Since Station 6 was sampled on only four occasions in 1979 it is difficult to obtain even a reasonably accurate assessment of the trophic stratus at this station. Based on the seasonal means for the two parameters monitored, the lake in the vicinity of this station would be considered unenriched.

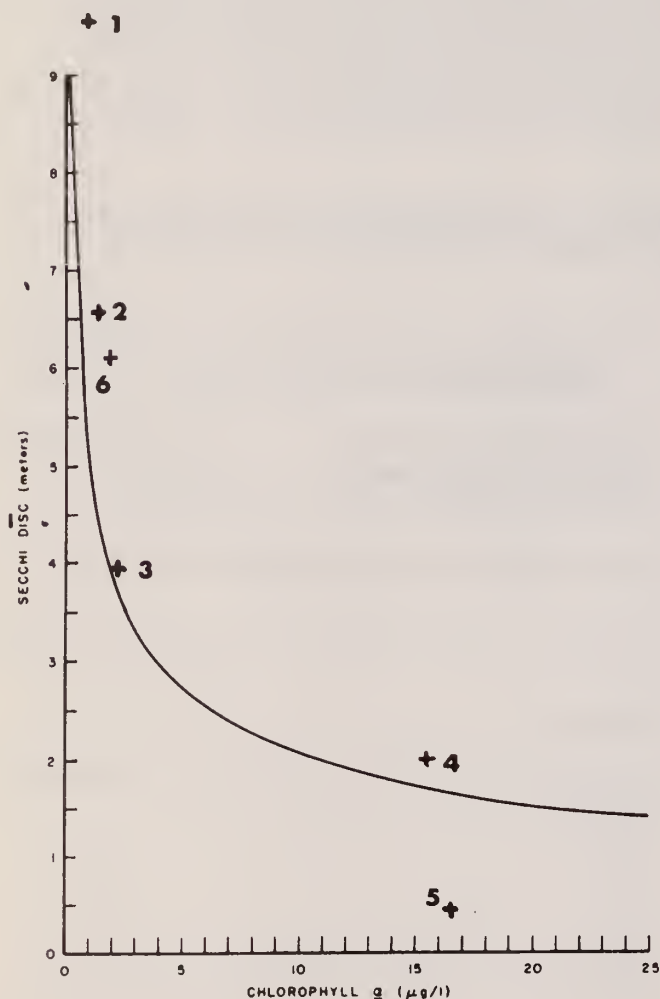
trends are evident in the fluctuations exhibited by either the Secchi disc readings or chlorophyll a concentrations at Station 13. Based on the seasonal means for these parameters, the lake in the vicinity of this station would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae.



Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Miskwabi Lake from 1975 to 1979.

Year	Stn. 6		Stn. 13	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
1971				
1972				
1973				
1974				
* 1975	7.7	1.6	7.0	1.6
1976	6.4	1.6	5.6	2.2
1977	7.9	- -	5.9	- -
1978	6.5	1.5	5.8	2.1
1979	6.6	1.7	5.6	2.0
"				

\* MOE Data



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Miskwabi Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Miskwabi Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The 1979 Seasonal mean Secchi disc readings and chlorophyll a concentrations are within the range of values previously measured on Miskwabi Lake. The variations in the yearly mean values reflect natural fluctuations. The overall condition of Miskwabi Lake appears stable and it is recommended that participation in this program continue, with an increased sampling frequency at Station 6.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

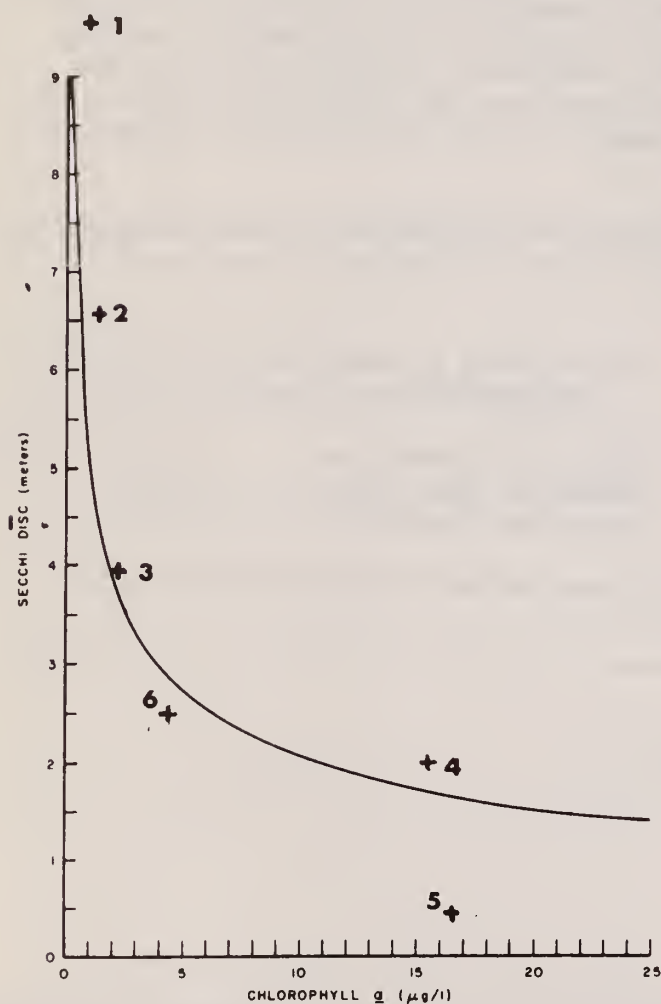
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Morrison Lake.

Date	Stn. S.D.	1 Chloro. <u>a</u>	Stn. S.D.	2 Chloro. <u>a</u>
Aug. 20	1.25	5.9	1.75	3.3
" 27	3.25	3.4	3.5	3.1
Sept. 11	2.25	5.7	2.25	5.7
Oct. 1	2.5	3.9	3.5	3.6
Mean	<u>2.3</u>	<u>4.8</u>	<u>2.8</u>	<u>3.9</u>

Since Morrison Lake was sampled on only four occasions, it is difficult to make a reasonably accurate assessment of the lake's enrichment status. Based on the mean of the available data, Morrison Lake would be considered between a moderate enriched and an enriched lake, characterized by a low degree of water transparency and moderately high densities of suspended algae. The colouration of Morrison Lake results in the degree of transparency being lower than normally associated with the measured density of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Morrison Lake in 1979.

Year	Stn. 1		Stn. 2	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976				
1977				
1978				
1979	2.3	4.8	2.8	3.9
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Morrison Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Morrison Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

If this program is to continue the sampling frequency must be increased in order to obtain meaningful data.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

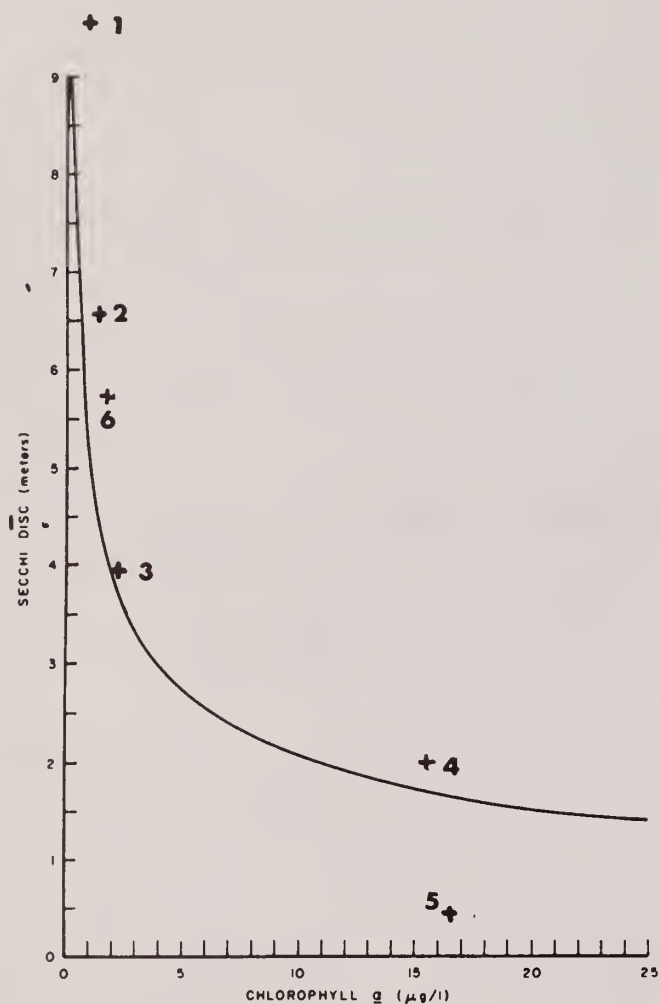
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Mountain Lake.

Date	Stn. S.D.	Chloro. <u>a</u>	South S.D.	Chloro. <u>a</u>	North S.D.	Chloro. <u>a</u>
May 20			- -	1.8	- -	1.6
June 3			- -	1.5	- -	1.3
June 16			4.5	1.8	4.5	1.6
July 1			5.0	1.4	5.5	1.4
July 8			7.5	2.5	6.0	1.8
July 15			8.5	1.6	8.0	1.7
July 21			- -	1.3	- -	1.5
July 5			5.5	1.5	5.0	1.7
July 31			5.0	1.6	4.5	1.4
Aug. 26			6.5	2.6	6.5	2.4
Sept. 2			5.0	1.8	5.0	1.5
Mean			5.9	1.8	5.6	1.6

The Secchi disc readings at the two stations sampled varied from 4.5 to 8.5 metres, with the maximum readings occurring in mid-July. The Secchi disc readings are missing for three sampling dates, as they were not recorded on the sample submission forms. The chlorophyll a concentrations ranged from 1.3 to 2.6 ug/L. No trends are evident in the variations experienced by either of these parameters. Based on the seasonal means for the two parameters monitored, Mountain Lake would be considered unenriched, characterized by a high degree of water transparency and low densities of suspended algae. The variation in water quality between the two locations sampled is minimal.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a ( $\mu\text{g/l}$ ) data collected from Mountain Lake in 1979.

Year	Stn. S.D.	South Chloro. <u>a</u>	Stn. S.D.	North Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976				
1977				
1978				
1979	5.9	1.8	5.6	1.6
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Mountain Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Mountain Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph illustrates the enrichment status of Mountain Lake relative to other Southern Ontario Lakes. Although it is slightly more enriched than Twelve Mile Lake, it is far removed from such highly enriched water bodies as Lake Scugog. Continued participation in this program is required to determine any long term trends in the quality of Mountain Lake.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

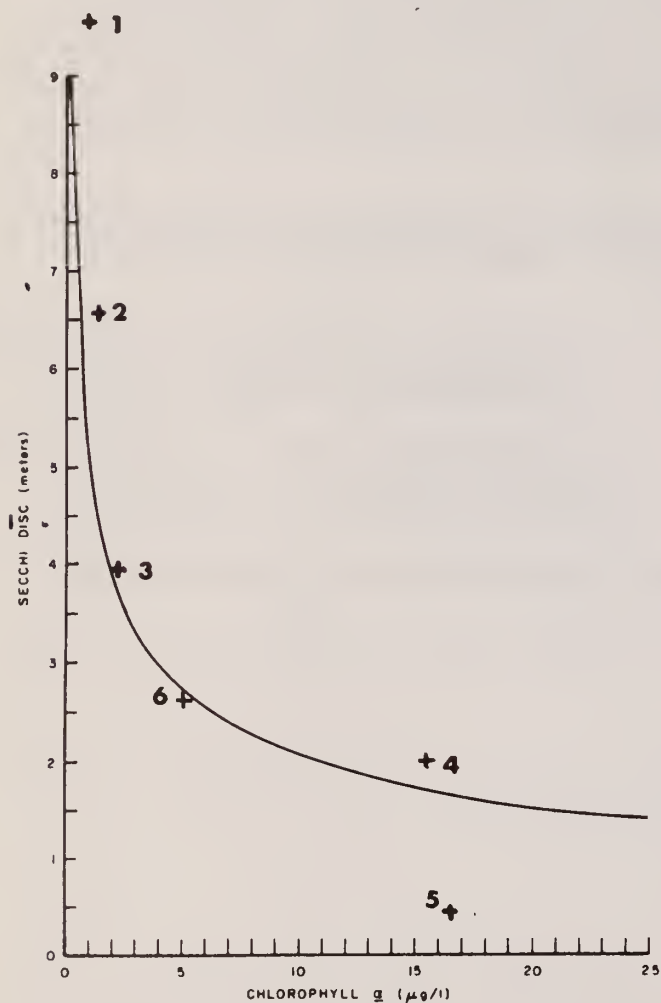
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Muldrew Lake.

Date	Stn.	North Lake
	S.D.	Chloro. <u>a</u>
June 18	2.7	4.9
July 8	2.5	4.4
July 16	2.5	4.8
July 23	2.5	5.5
Aug. 5	2.55	6.8
Aug. 20	3.10	4.6
Aug. 27	2.5	3.7
Sept. 3	3.1	- -
Mean	<u>2.7</u>	<u>5.0</u>

The Secchi disc readings remained relatively constant during the period sampled, varying from 2.5 to 3.1 metres. The chlorophyll a concentrations were more variable, ranging from 3.7 to 6.8 ug/L. The concentrations generally increased during the first half of sampling period, peaked in early August and then declined during the remainder of the period sampled. Based on the seasonal means of the parameters monitored, Muldrew Lake would be considered enriched, characterized by a low degree of water transparency and high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Muldrew Lake in 1976 to 1979.

Year	Stn. S.D.	North Chloro. <u>a</u>	Stn. S.D.	Throw Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976	3.9	2.9	3.3	3.8
1977	3.7	- -		
1978 *	3.0	1.9		
1979	2.7	5.0		
"			* based on 2 samples	



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Muldrew Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Muldrew Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Since commencement of this program on Muldrew Lake in 1976, there has been a decline in the degree of water transparency and an increase in the density of suspended algae, based on the yearly mean data. Continued participation in this program is required to determine if this change is due to natural fluctuations or represents an alteration in the Lake's quality.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.)  
(metres - m)

Chlorophyll a concentrations (Chloro. a)  
(micrograms per litre - ug/l)

enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Muskoka Bay.

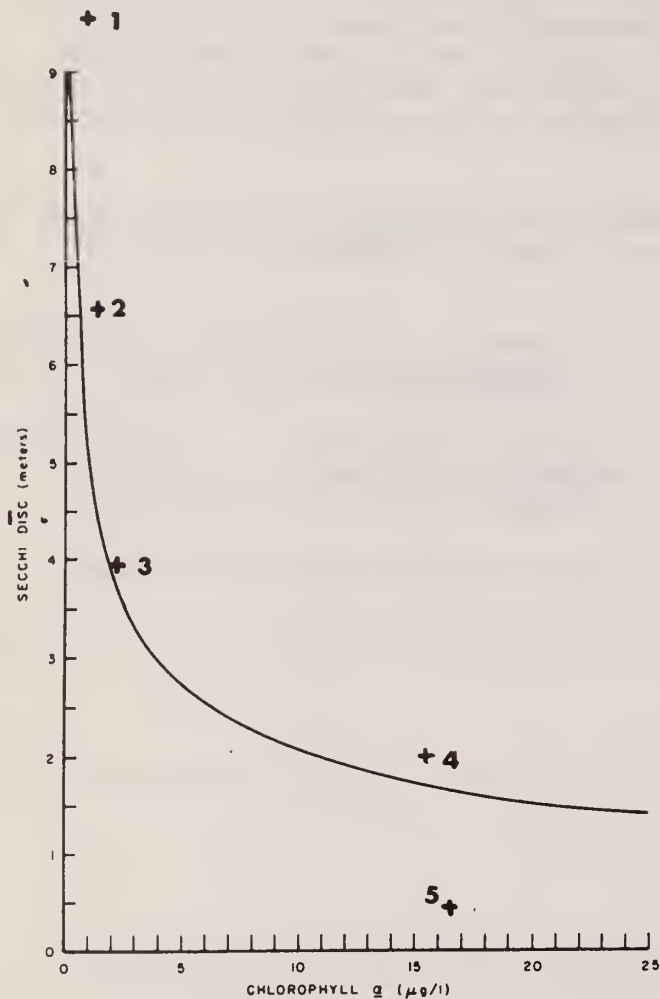
Date	Stn. S.D.	1 Chloro. <u>a</u>	Stn. 2 S.D.	Chloro. <u>a</u>
July 7	4.5	2.4	4.5	4.3
July 22	6.0	2.7	5.0	3.5

Insufficient data was collected to allow any meaningful conclusions to be reached.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Muskoka Bay from 1971 to 1979.

Year	Stn. 1 S.D.	Chloro. <u>a</u>	Stn. 2 S.D.	Chloro. <u>a</u>
*1971	1.9	13.8		
*1972	3.1	8.1		
*1973	3.2	6.9		
*1974	2.7	5.0		
*1975	3.9	5.0		
*1976	3.7	10.6		
1977	4.3	- -	4.1	- -
1978	4.8	2.5	4.8	2.3
1979	"			

\*MOE Data



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972

Figure 1: The relationship between Secchi disc and chlorophyll a for and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to continue, the sampling frequency must be increased in order that meaningful data may be obtained.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
enriched	5 m or more	low algal densities	0-2 ug/l

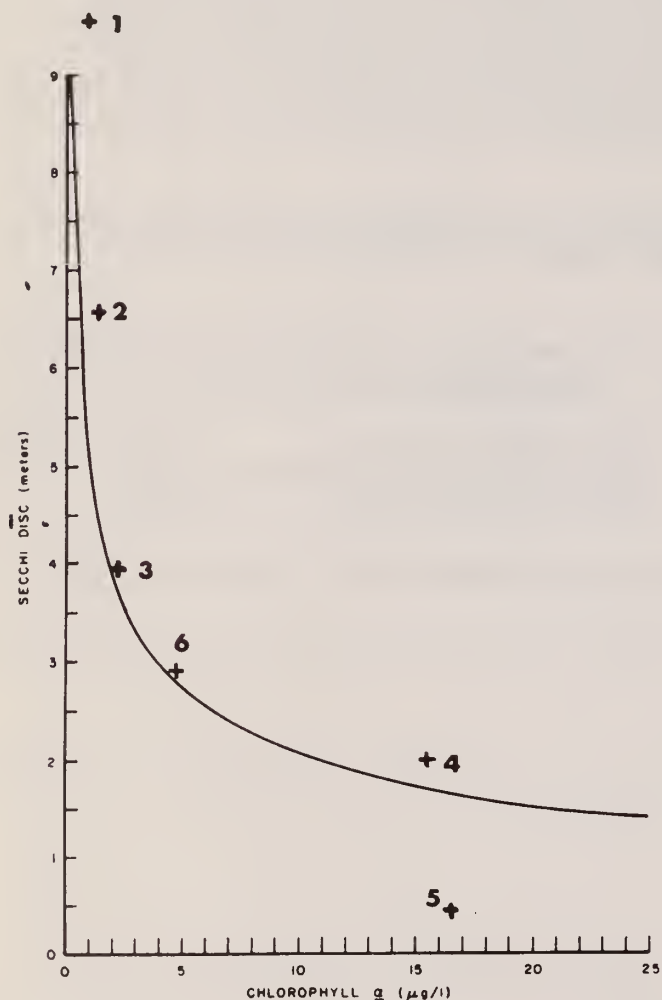
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Nine Mile Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
June 11	1.8	6.7
June 18	2.3	6.2
June 25	2.2	4.8
July 9	3.0	6.5
July 16	3.25	7.6
July 23	3.5	4.7
July 30	3.0	3.4
Aug. 13	2.0	5.7
Aug. 20	4.7	5.4
Aug. 27	3.0	5.4
Sent. 17	3.0	3.1
Sent. 24	2.75	5.0
Oct. 1	3.0	4.5
Oct. 22	3.3	1.6
Mean	<u>2.9</u>	<u>5.0</u>

The Secchi disc readings varied from 1.8 to 4.7 metres and the chlorophyll a concentrations ranged from 1.6 to 7.6 ug/L during the period sampled. The lowest measurements of water transparency were recorded in June, corresponding to highest chlorophyll a measurements. Based on the seasonal means of the two parameters monitored, Nine Mile Lake would be considered enriched, characterized by a moderately low degree of water transparency and high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Nine Mile Lake in 1979.

Year	Stn.	S.D.	Chloro. <u>a</u>
1971			
1972			
1973			
1974			
1975			
1976			
1977			
1978			
1979		2.9	5.0
"			



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Nine Mile Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Nine Mile Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph illustrates the enrichment status of Nine Mile Lake relative to a number of other Southern Ontario Lakes. Although it is more enriched than Balsam Lake, a moderately enriched lake, it is considerably removed from such highly enriched water bodies as Lake Scugog. Continued participation in this program is required to define any long-term trends in the quality of Nine Mile Lake.

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ORR LAKE  
Flos Township  
County of Simcoe

Ministry  
of the  
Environment

Central Region

SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Orr Lake.

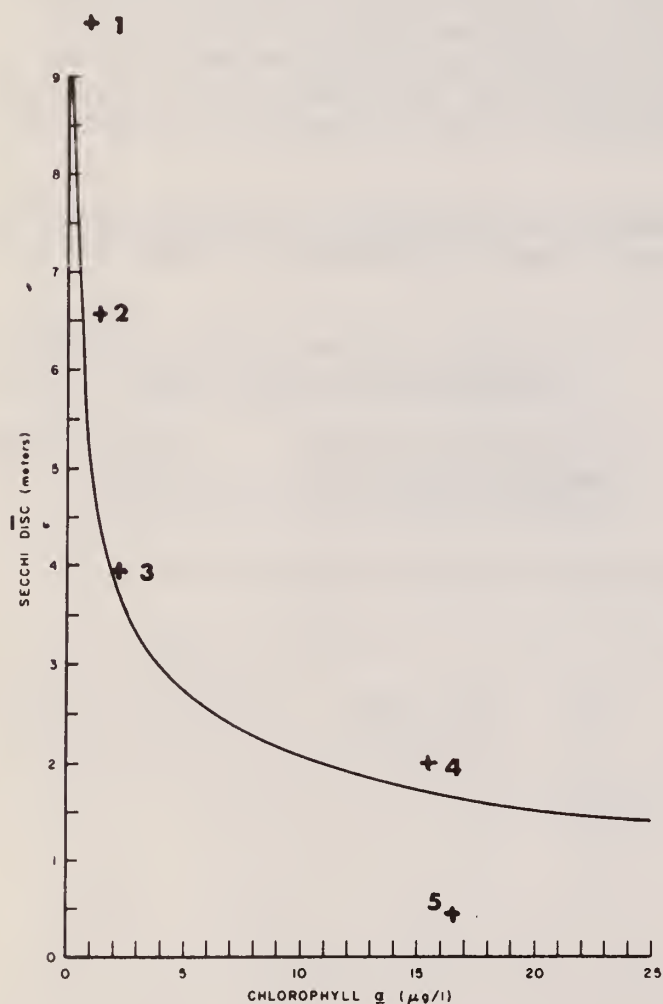
Date	Stn.	N.E. Corner	Stn. Centre	Stn.	S.E. Corner	Stn. N.W. Corner
	S.D.	Chloro. <u>a</u>	S.D. Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D. Chloro. <u>a</u>
May 24	- -	- -	- - - -	- -	- -	- - - -
June 1	1.8	1.2	- - - -	1.8	3.2	- - - -
July 23	- -	- -	- - - -	- -	- -	- - - -
Aug. 13	- -	- -	- - - -	- -	- -	2.1 2.1
Sept. 16	- -	- -	2.1 0.9	- -	- -	- - - -

Insufficient data was collected from any of the sampling locations to allow any meaningful conclusion to be made.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from

Year	Stn.	S.D.	Chloro. <u>a</u>
------	------	------	------------------

1971
1972
1973
1974
1975
1976
1977
1978
1979
"



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972

Figure 1: The relationship between Secchi disc and chlorophyll a for and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to continue, the number of sampling locations must be decreased, and the sampling frequency at the remaining stations increased, in order that meaningful data can be obtained.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

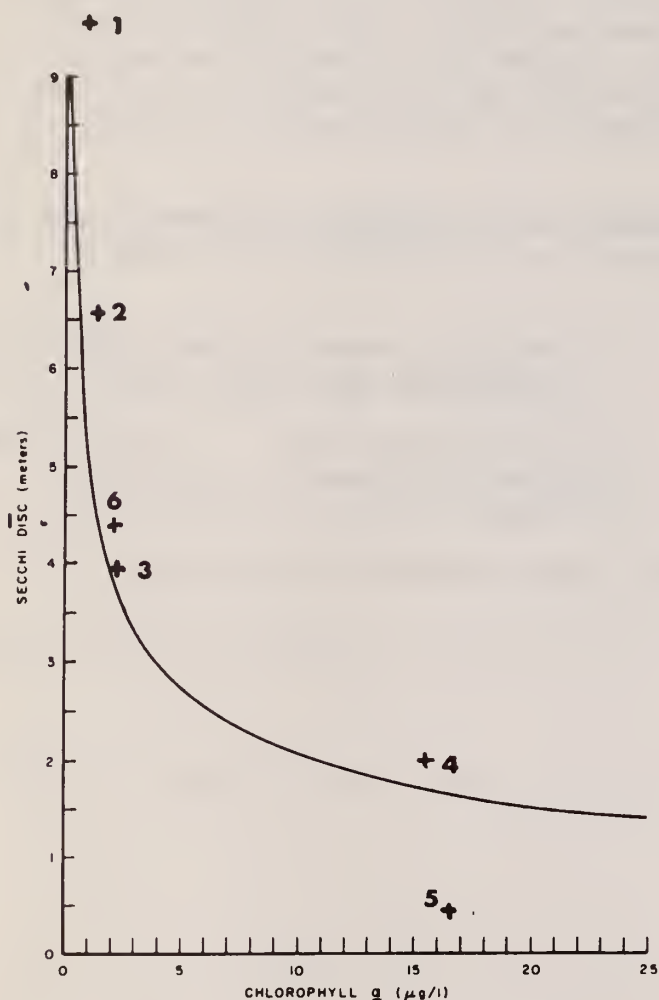
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Percy Lake.

Date	Stn. S.D.	Main Chloro. <u>a</u>
May 21	3.0	2.0
June 3	3.5	0.7
June 17	4.0	1.6
July 2	4.75	1.3
July 29	5.25	2.7
Aug. 6	5.31	1.9
Aug. 26	4.0	3.7
Sept. 3	5.5	2.7
Mean	4.4	2.1

The Secchi disc readings increased steadily from a minimum reading of 3.0 metres on May 21st to 5.3 metres on August 6th. The chlorophyll a concentrations ranged from 0.7 to 3.7 ug/L during the period sampled. No trends are evident in the variations exhibited by this parameter. Based on the seasonal means for the two parameters monitored, Percy Lake would be moderately enriched, characterized by a moderately high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Percy Lake in 1978 and 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
1974		
1975		
1976		
1977		
1978	4.1	2.2
1979	4.4	2.1
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Percy Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Percy Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The variation in the seasonal mean Secchi disc reading and chlorophyll a concentration between 1978 and 1979 is minimal, indicating no change in the lake's status. Continued participation in this program is recommended, in order to better define long-term water quality trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

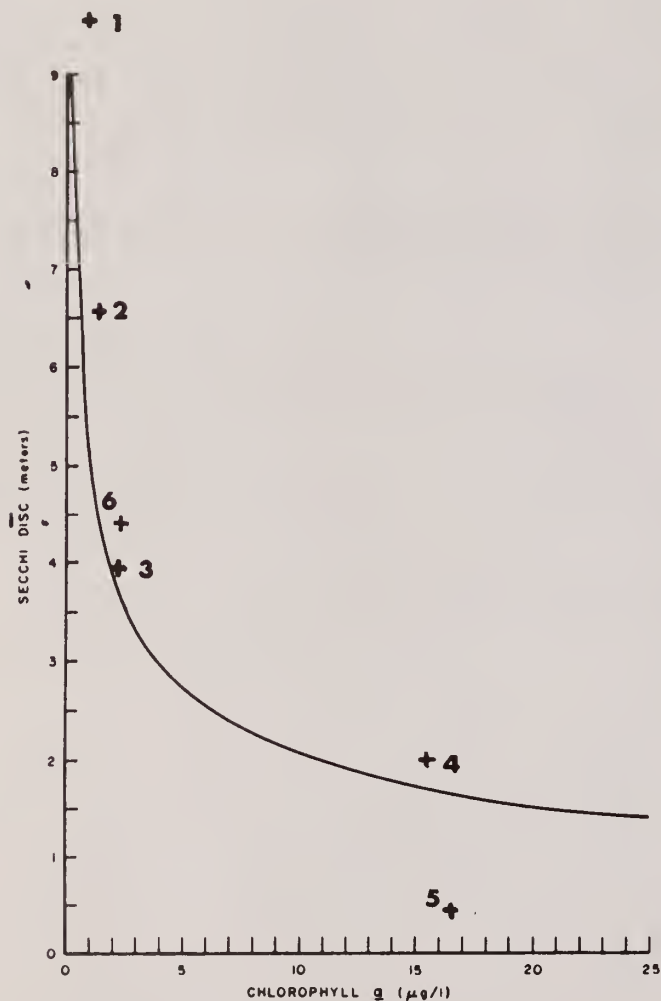
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Pine Lake.

Date	Stn.	Main
	S.D.	Chloro. <u>a</u>
July 9	3.8	3.3
July 22	- -	3.0
Aug. 13	4.4	2.0
Sept. 2	- -	1.4
Sept. 24	4.9	0.8
Mean	4.4	2.1

Since the Secchi disc reading was not reported on two sampling dates, it is difficult to interrupt the available data. Based on the seasonal means of the available data, Pine Lake would be considered moderately enriched, characterized by a moderately high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Pine Lake from 1974 to 1977, 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
1974	5.0	1.5
1975	5.7	1.8
1976	- -	- -
1977	5.0	- -
1978	- -	- -
1979	4.4	2.1
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Pine Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Pine Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Whether the decrease in the seasonal mean Secchi disc reading in 1979 is indicative of an alteration in the quality of Pine Lake cannot be determined from the available data. It is recommended that participation in this program be continued in order that future trends in the water quality of Pine Lake can be examined.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

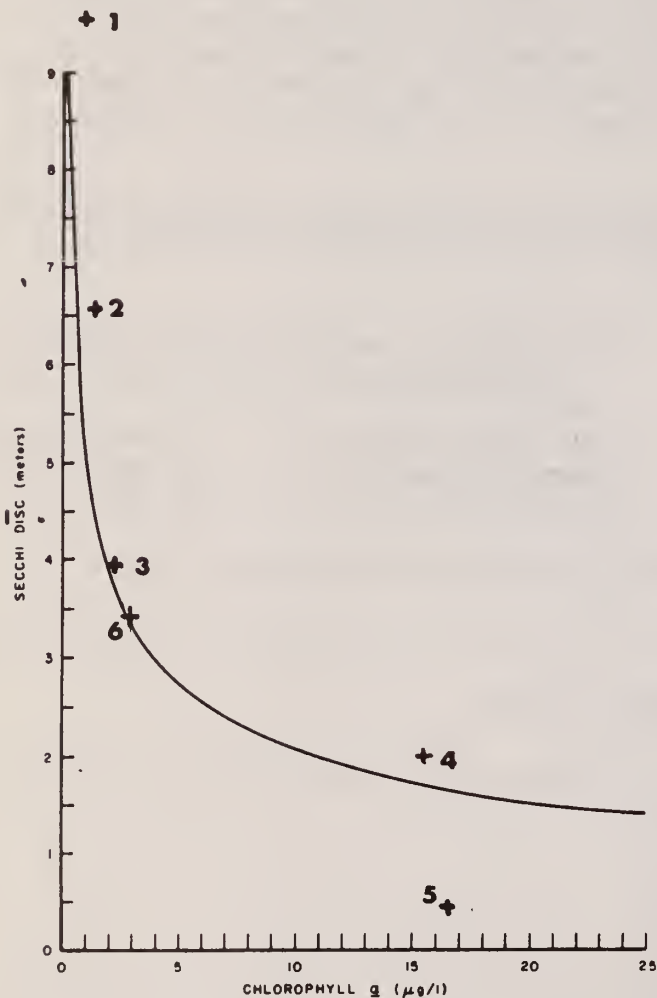
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Pine Lake.

Date	Stn. S.D.	Upper 1st Lake Chloro. <u>a</u>	Stn. S.D.	Lower 2nd Lake Chloro. <u>a</u>
May 21	2.25	2.0	2.75	1.6
July 4	3.25	2.1	2.25	- -
Aug. 11	4.1	3.1	4.15	3.6
Aug. 21	3.5	3.1	4.1	4.6
Sept. 9	3.6	2.1	3.6	2.6
Sept. 23	3.7	4.5	3.7	3.6
Mean	<u>3.4</u>	<u>2.8</u>	<u>3.4</u>	<u>3.2</u>

The maximum Secchi disc reading was recorded at both sampling locations on August 11th, the minimum readings were taken during late May and early July. No trend is evident in the fluctuations experienced by the chlorophyll a concentrations. Based on the seasonal means for the two parameters monitored, Pine Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and moderate densities of suspended algae. The variation in water quality between the sampling locations is minimal.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Pine Lake in 1979.

Year	Stn. S.D.	Upper 1st Lake Chloro. <u>a</u>	Stn. S.D.	Lower 2nd Lake Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976				
1977				
1978				
1979	3.4	2.8	3.4	3.2
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Pine Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Pine Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph illustrates the enrichment status of Pine Lake relative to a number of other Southern Ontario Lakes. Although slightly more enriched than Balsam Lake, another moderately enriched water body, it is far removed from such highly enriched water bodies as Lake Scugog. It is recommended that participation in this program be continued in order to define long-term water quality trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from RIL LAKE.

Date	Stn.	A	
	S.D.	Chloro. <u>a</u>	
June 21	2.3	5.6	
July 4	2.1	4.4	
July 11	2.3	3.1	
July 18	2.7	4.2	
Aug. 1	3.0	4.4	
Aug. 14	2.1	5.5	
Aug. 21	3.0	8.4	
Mean	<u>2.5</u>	<u>5.1</u>	

The Secchi disc readings remained relatively constant during the period sampled, varying from 2.1 to 3.0 metres and averaging 2.5 metres. The chlorophyll a concentration increased significantly during the later portion of the sampling period. This same trend was also apparent last year. Based on the seasonal means of these two parameters, Ril Lake would be considered enriched, characterized by a low degree of water transparency and high degree of suspended algae.



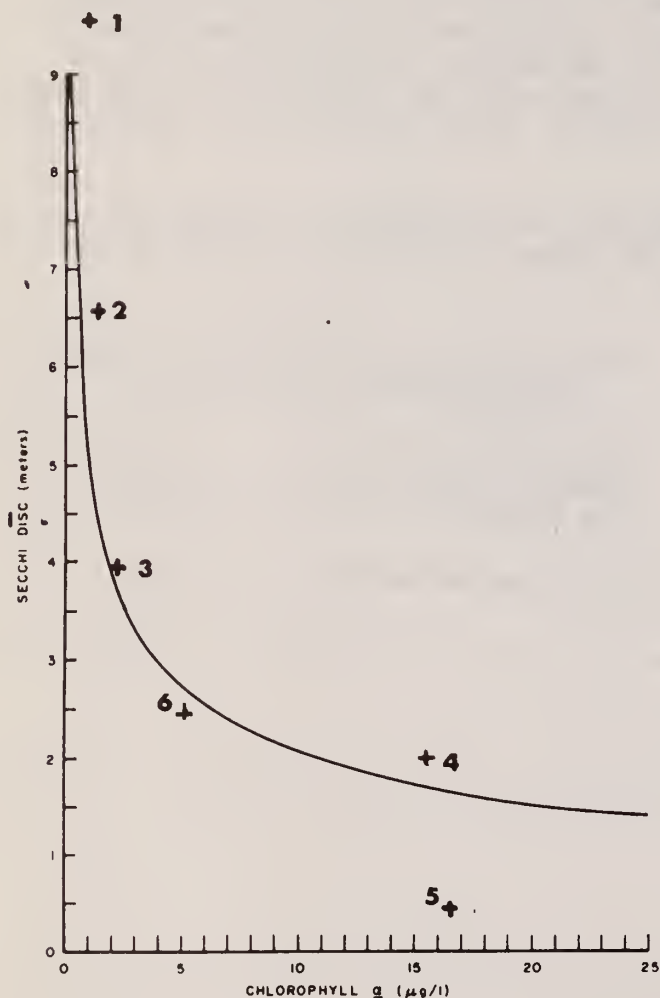
Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from RIL LAKE in 1972, 1976 and 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
------	-----------	-----------------------

1971		
* 1972	2.5	4.3
1973		
1974		
1975		
1976	3.3	3.9
1977	3.0	- -
1978	3.1	3.8
1979	2.5	5.1

"

\* MOE data



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Ril Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Ril Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The seasonal mean Secchi disc reading in 1979 had declined to the level measured in 1972. This was accompanied by a corresponding increase in the mean chlorophyll a concentration. Whether or not this reflects an alteration in the quality of Ril Lake cannot be determined from the available data. It is recommended that participation in this program be continued, in order to monitor future water quality trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Round Lake.

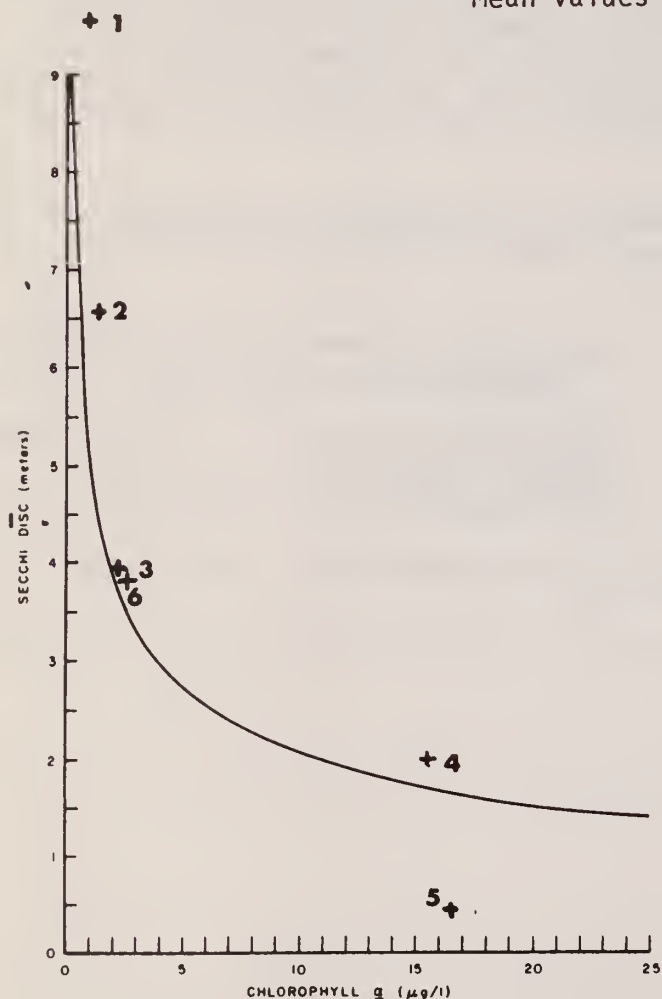
Date	Stn.	Main	
	S.D.	Chloro. <u>a</u>	
July 2	3.25	3.0	
July 8	3.5	3.7	
July 14	4.0	2.2	
July 21	4.0	2.4	
July 29	4.5	2.2	
Aug. 6	4.0	2.4	
Aug. 11	3.25	1.7	
Aug. 19	4.50	4.0	
Sept. 3	3.0	3.9	
Mean	<u>3.8</u>	<u>2.8</u>	

Fluctuations in the values presented in Table 1 were probably due to day to day variations in weather conditions. Average Secchi disc reading and chlorophyll a concentration indicate that Round Lake is moderately enriched with moderate algal densities.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Round Lake in 1977, 1978 and 1979.

Year	Stn.	S.D.	Chloro. <u>a</u>
1971			
1972			
1973			
1974			
1975			
1976			
1977	2.9		
1978	3.3	2.5	
1978	4.0	2.6	
1979	3.8	2.8	

\* Mean values from MOE/7 Links Quality Survey 1978.



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Round Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Round Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

There appears to be a slight trend to improved water quality in the values found in Table 2. However, continued participation in the sampling program is necessary to be sure of any long-term trends in enrichment status.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Salerno Lake.

Date	Stn. S.D.	A Chloro. <u>a</u>	Stn. S.D.	B Chloro. <u>a</u>
July 2	3.25	3.2	3.5	3.4
July 15	3.75	2.0	4.0	2.5
July 29	8.0	2.4	6.0	2.2
Aug. 26	5.0	7.0	6.5	6.5
Mean	5.0	3.7	Mean	5.0
				3.7

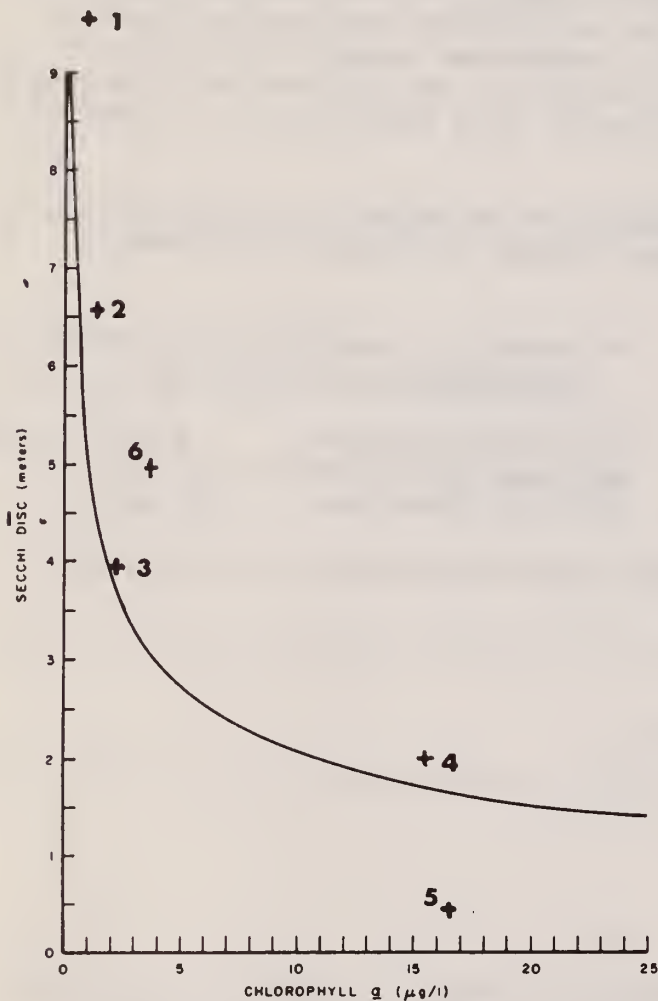
Since Salerno Lake was sampled on only four occasions in 1979, it is difficult to obtain a reasonably accurate assessment of the lake's trophic status. Based on the seasonal means of the available data, Salerno Lake would be considered moderately enriched, characterized by a high degree of water transparency and moderate densities of suspended algae.



Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Salerno Lake from 1973 to 1979.

Year	Stn. A S.D.	Chloro. <u>a</u>	Stn. B S.D.	Chloro. <u>a</u>
1971				
1972				
* 1973	6.0	1.9		
1974	- -	- -		
1975	3.6	4.0	4.5	2.2
1976	3.6	3.0	3.9	2.6
1977	4.1		4.4	
1978	4.0	3.7	4.3	3.0
1979	5.0	3.7	5.0	3.7
"				

\* Mean of 3 stations



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Salerno Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Salerno Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

Although the seasonal mean Secchi disc readings increased in 1979, this is not thought to reflect on improvement in water quality, but rather be due to natural fluctuations. Continued participations in this program, with more frequent sampling is recommended, to determine future water quality trends.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

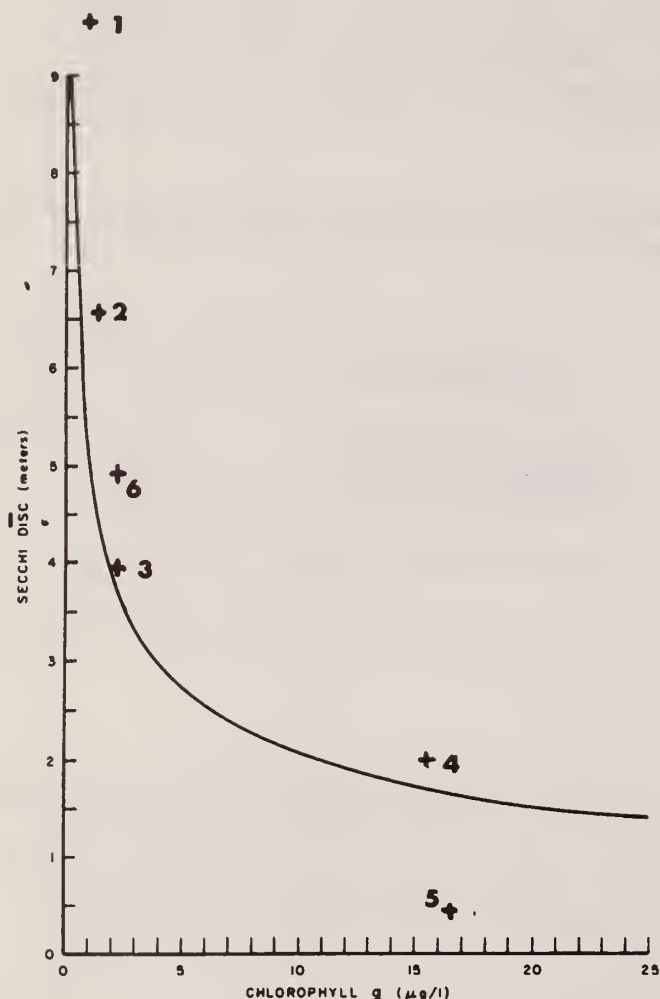
Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Shadow Lake.

Date	Stn. S.D.	Main Chloro. <u>a</u>	
June 17	3.9	2.7	Because of the large number of samples taken in this excellent program more of the day to day fluctuations in Secchi disc readings and chlorophyll <u>a</u> concentration were recorded. Based on the coverage values of these two parameters, Shadow Lake is considered moderately enriched with a relatively low algal density.
June 24	4.6	2.4	
July 2	3.8	1.9	
July 8	4.8	2.0	
July 15	5.4	1.6	
July 22	5.2	5.8	
July 29	4.9	2.5	
Aug. 12	5.2	1.2	
Aug. 19	5.2	1.7	
Aug. 26	5.2	2.2	
Sept. 3	4.9	2.0	
Oct. 8	5.2	1.7	
Mean	<u>4.9</u>	<u>2.3</u>	

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Shadow Lake from 1972 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971	6.0	1.0
1972	5.0	0.7
1973	5.0	1.0
1975	- -	- -
1976	- -	- -
1977	4.3	- -
1978	4.8	1.8
1979	4.9	2.3
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Shadow Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Shadow Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The variation in Secchi disc readings and chlorophyll a concentration noted in Table 2 are probably due to natural year to year fluctuations. Continued participation in the sampling program is encouraged.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Six Mile Lake.

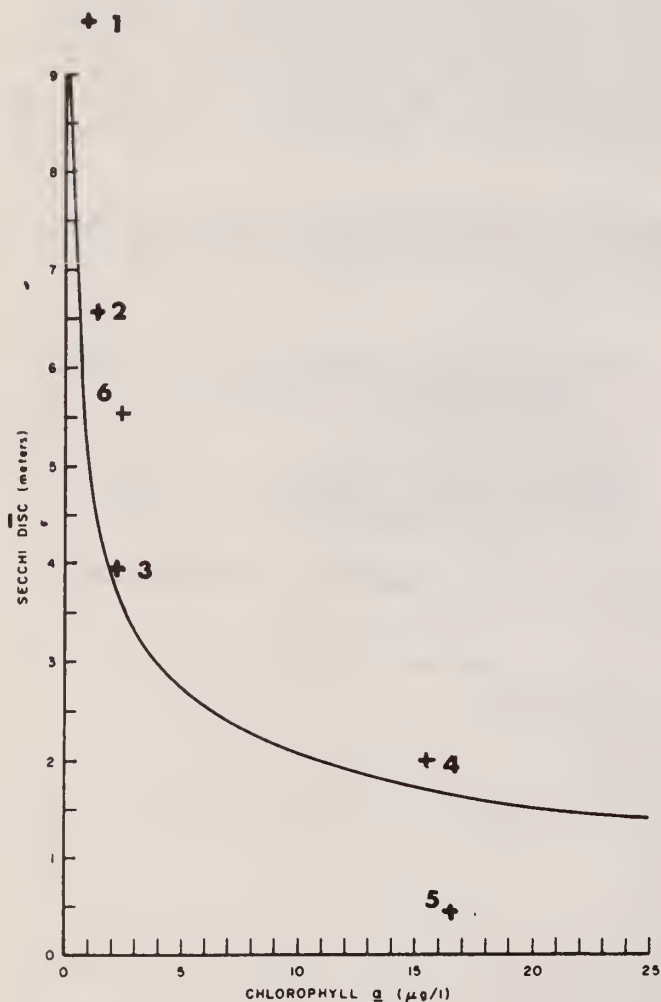
Date	Stn. 1 (S.Crooked Bay)		Stn. 2 (Lost Channel)	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro <u>a</u>
June 3	2.7	2.4	2.8	4.2
June 17	3.4	3.6	3.2	2.2
June 24	4.8	3.9	4.4	2.1
July 12	4.5	2.2	4.6	2.0
July 14	5.7	2.2	5.4	3.3
July 22	6.5	1.9	5.6	3.2
July 29	6.5	1.3	7.3	1.9
Aug. 6	7.3	1.5	6.4	2.9
Aug. 12	7.5	1.6	7.5	1.8
Aug. 26	6.0	2.1	7.5	1.8
Sept. 2	6.0	-	5.5	1.6
Sept. 9	5.3	1.7	5.5	2.0
Sept. 20	6.4	2.2	5.4	2.0
Mean	5.6	2.2	Mean	5.5
				2.4

The minimum Secchi disc readings at both stations were recorded in June, and in general the readings then improved until mid-August. The maximum chlorophyll a concentrations were also measured during the first part of the sampling period. Based on the seasonal means of these two parameters, Six Mile Lake would be considered on the borderline between an unenriched and a moderately enriched lake. The lake is characterized by a high degree of water transparency and moderately low densities of suspended algae.



Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Six Mile Lake from 1977 to 1979.

Year	Stn. -1 (S. Crooked Bay)		Stn. 2 (Lost Channel)	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976				
1977	4.1		4.1	
1978	4.1	2.4	3.8	2.9
1979	5.6	2.8	5.5	2.4
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Six Mile Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Six Mile Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The variation in the 1979 seasonal mean data from that measured in 1978 is probably due to natural fluctuations rather than an alteration in the quality of Six Mile Lake. Continued participation in this program is recommended to determine future water quality trends.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

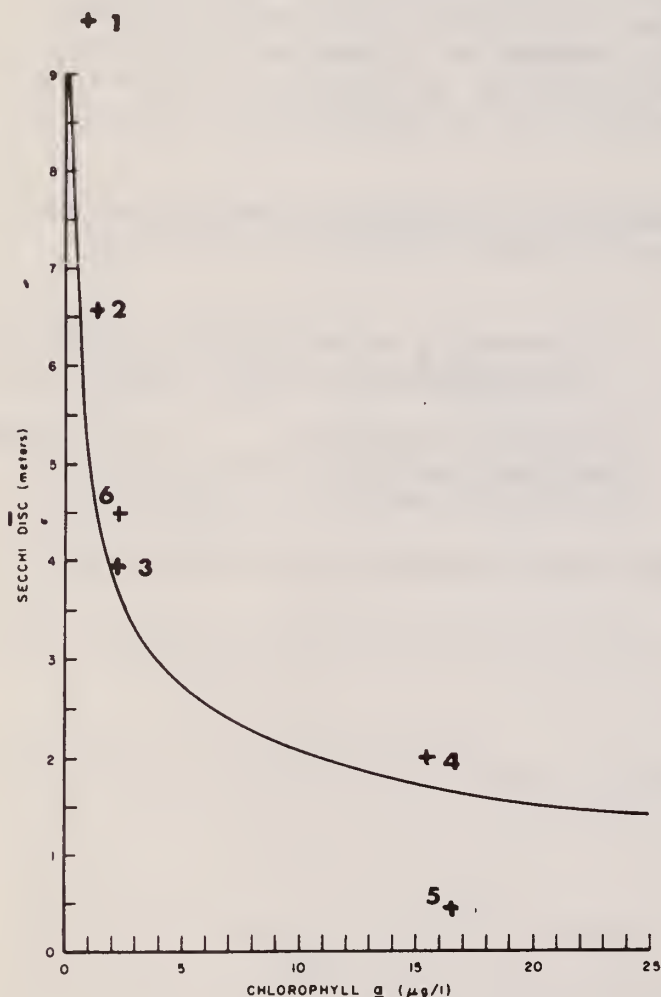
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from SOYERS LAKE.

Date	Stn.	Main S.D.	Chloro. <u>a</u>
May 21	4.1	1.4	
June 17	3.3	0.9	
July 1	4.1	2.2	
July 15	5.0	1.5	
July 22	4.3	1.9	
July 29	5.8	2.2	
Aug. 6	4.6	3.3	
Aug. 12	4.9	2.2	
Aug. 26	4.3	2.7	
Sept. 3	4.3	2.6	
Oct. 8	4.9	3.4	
Mean	4.5	2.2	

The Secchi disc readings varied from 3.3 to 5.8 metres and the chlorophyll a concentration varied from 0.9 to 3.4 metres during the period sampled. No trends are evident in the fluctuations exhibited by either of these parameters. Based on the seasonal means of the two parameters monitored, Soyars Lake would be considered midway between an unenriched and moderately enriched lake. The lake is characterized by moderately high degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Soyers Lake from 1973 to 1979.

Year	Stn. S.D.	Chloro. <u>a</u>
1971		
1972		
1973	3.8	1.7
1974	4.4	0.9
1975	3.5	2.1
1976	4.3	1.7
1977	5.0	
1978	5.2	1.8
1979	4.5	2.2
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Soyers Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Soyers Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The 1979 seasonal mean Secchi disc reading is within the range of seasonal values previously measured on Soyers Lake. Although the 1979 seasonal chlorophyll a concentration is slightly higher than previous years, this is attributable to natural fluctuations rather than an alteration of the lake's overall quality. Continued participation in this program is recommended, to enable future water quality trends in Soyers Lake to be monitored.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Stony Lake.

Date	Stn. A		Stn. B		Stn. C	
	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>	S.D.	Chloro. <u>a</u>
May 29	3.5	1.6				
June 24	3.0	1.2	3.2	3.2	2.4	6.9
Aug. 8	4.0	3.1				
Aug. 22	4.0	2.0				
Sept. 12	4.0	5.2				
Mean	3.7	2.6				

Only Station 'A' was sampled a sufficient number of times to draw meaningful conclusions. Based on the average values of the two parameters the upper basin of Stony Lake (as represented by Station 'A') is considered moderately enriched.

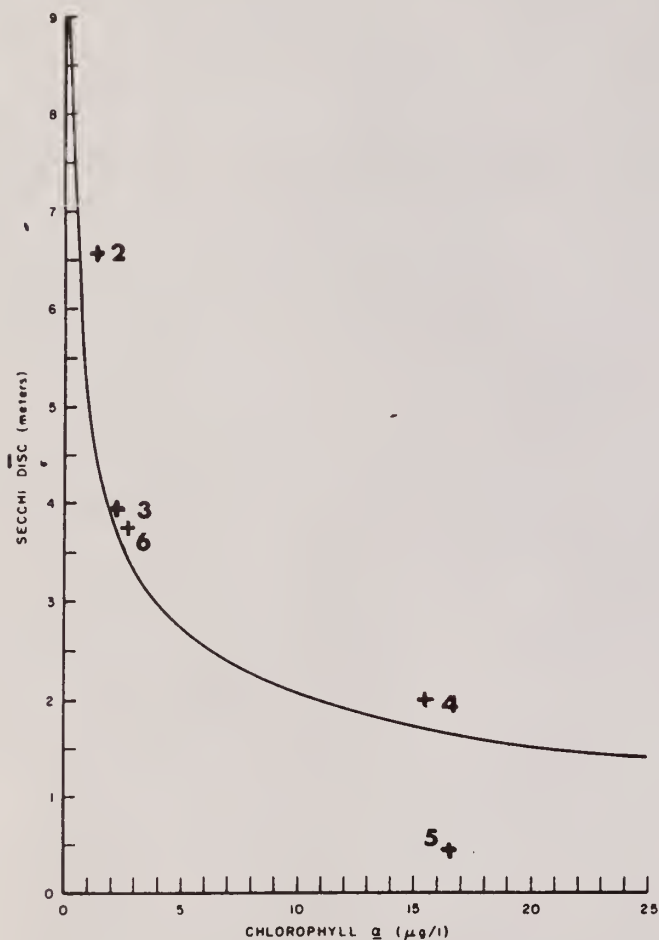


Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Stony Lake between 1971 and 1979.

Year	Stn. S.D.	A Chloro. <u>a</u>	Stn. S.D.	B Chloro. <u>a</u>	Stn. S.D.	C Chloro. <u>a</u>
1971*	4.8	2.3	- -	- -	- -	- -
1972*	3.7	2.8			2.5	4.7
1973						
1974						
1975						
1976*	4.3	3.9				
1977			3.0	1.5	2.3	5.7
1978	3.0	2.1			4.0	1.1
1979	3.7	2.6				
1978	4.6	3.1			2.6	5.7

\* Mean values of samples taken by MOE staff.

\*\* Mean values from MOE/7 links Water Quality Survey 1978.



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Stony Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Stony Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

From values presented in Table 2 there is still no defined trend in the trophic status of Stony Lake since 1971. The year to year variation at Station A (which is representative of the upper basin of the lake) may indicate a relatively stable trophic status for the period with mean Secchi disc and Chlorophyll a concentration ranging between 3.7 to 4.8 m and 2.1 to 3.9 ug/l respectively. Continued participation in the sampling program, especially for stations B and C is encouraged.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
enriched	5 m or more	low algal densities	0-2 ug/l

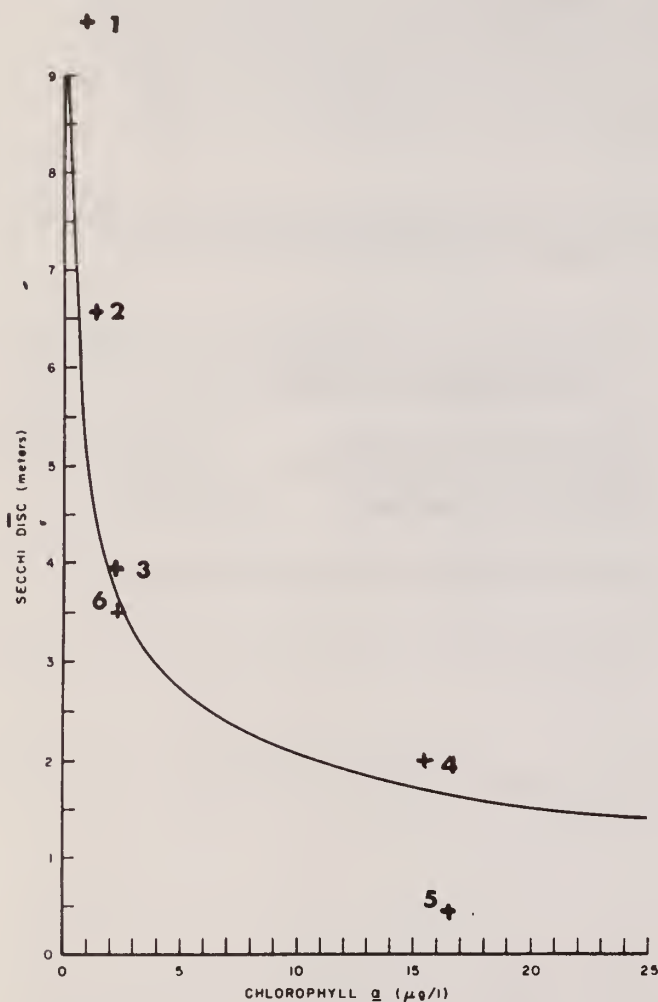
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Stormy Lake.

Date	Stn.	S.D.	Main Chloro. <u>a</u>
May 21		4.6	2.1
June 2		3.0	4.1
July 15		3.0	2.0
Aug. 12		3.0	2.3
Sept. 2		4.0	1.1
Mean		<u>3.5</u>	<u>2.3</u>

The Secchi disc readings varied from 3.0 to 4.6 metres and the chlorophyll a concentrations ranged from 1.1 to 4.1 ug/l during the period sampled. No trends are evident in the variations experienced by either of these parameters. Based on the seasonal means of these two parameters, Stormy Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and moderately low densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Stormy Lake from 1972 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972	2.8	1.9
1973	3.7	1.6
1974	2.4	1.4
1975	3.8	2.2
1976	3.7	1.5
1977	3.9	- -
1978	3.4	2.6
1979	3.5	2.3
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Stormy Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Stormy Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The 1979 seasonal mean Secchi disc reading and chlorophyll a concentration are within the range previously measured on Stormy Lake. The overall condition of the lake appears stable. It is recommended that participation in this program be continued, in order to determine if this condition persists.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
enriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Sunny Lake.

Date	Stn. S.D.	Central Chloro. <u>a</u>	North Bay S.D.	Chloro. <u>a</u>
May 13	2.5	5.8	2.5	7.2
June 3	5.4	3.0	-	1.2
June 16	4.5	6.0	3.5	3.6
July 2	4.5	4.6	3.5	2.1
July 8	6.5	5.5	4.0	2.9
July 29	7.0	4.6	4.0	2.6
Aug. 12	6.25	4.8	4.0	2.9
Aug. 26	6.0	5.2	4.0	2.3
Sept. 3	4.5	5.1	4.0	2.8
Sept. 15	4.5	6.2	4.0	3.5
Oct. 8	5.5	2.6	4.0	2.9
Mean	5.2	4.8	3.8	3.1

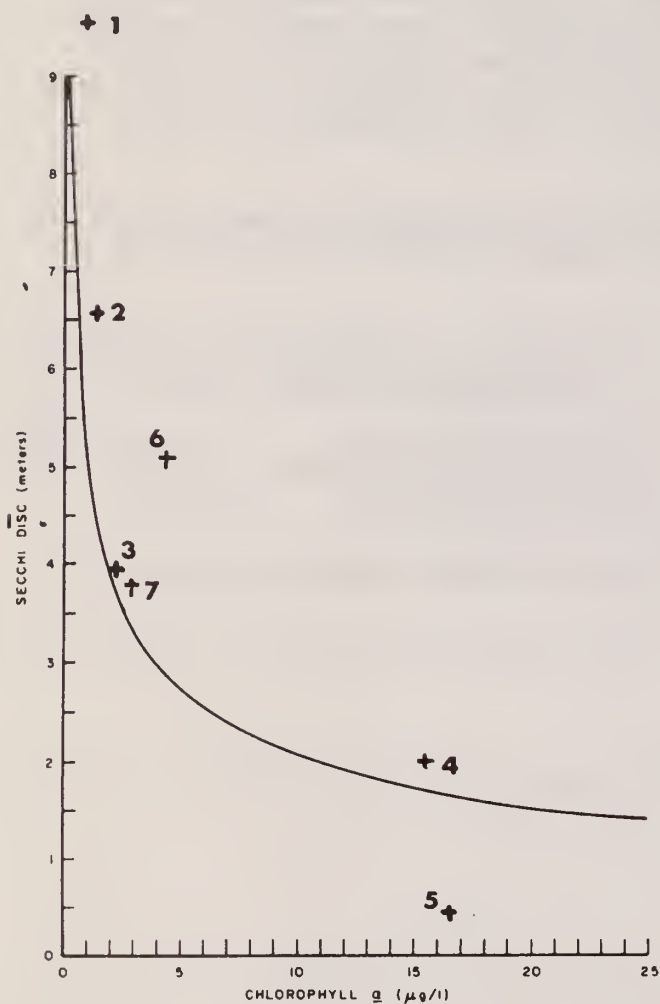
Based on the seasonal mean Secchi disc reading and chlorophyll a concentration the lake in the vicinity of the central sampling station is characterized by a high degree of water transparency and high densities of suspended algae. The transparency of Sunny Lake at the central sampling station is considerably greater than normally encountered in lakes having similar densities of suspended algae. A possible explanation for this is that the algae is concentrated in a narrow layer at a depth greater than the Secchi disc depth, rather than being distributed through the water column, as is normal. The algae therefore exert a minimal influence on the degree of water transparency, instead of being a major controlling factor.

The North Bay Station is characterized by a moderate degree of water transparency and moderate densities of suspended algae, indicating a moderately enriched status.



Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Sunny Lake in 1979.

Year	Stn. S.D.	Central Chloro. <u>a</u>	Stn. S.D.	North Bay Chloro. <u>a</u>
1971				
1972				
1973				
1974				
1975				
1976				
1977				
1978				
1979	5.2	4.8	3.8	3.1
"				



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Sunny Lake (Central) 1979
7. Sunny Lake (N. Bay) 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Sunny Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph illustrates the enrichment status of Sunny Lake relative to some other Southern Ontario Lakes. The status of the lake is between Twelve Mile and Balsam Lake, and is well removed from such highly enriched waterbodies as Lake Scugog. Continued participation in this program is required to determine any long-term trends in the quality of the lake.

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SECCHI DISC-CHLOROPHYLL a SELF-HELP PROGRAMME - 1979

The "Self-Help Programme" was initiated in 1971 in response to requests for water quality surveys from concerned cottagers on many recreational lakes throughout the Province. Previous experience indicated that the enrichment status of a lake can be estimated relatively easily by using Secchi disc readings and chlorophyll a concentrations (the green pigment in algae) to give an indication of water clarity and algal density respectively. (A more detailed explanation is provided in the publication on Eutrophication, which may be obtained from the address listed below). Volunteers are supplied with sampling kits, which includes a Secchi disc, a water sampler, bottles and instructions. Participants are asked to take Secchi disc readings and collect water samples biweekly during the ice-free period of the year. The water samples are shipped to the nearest Ministry of the Environment laboratory facilities where they are analyzed for chlorophyll a. The true value of the programme is only realized if it is continued for a number of years in order to define longterm trends.

Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

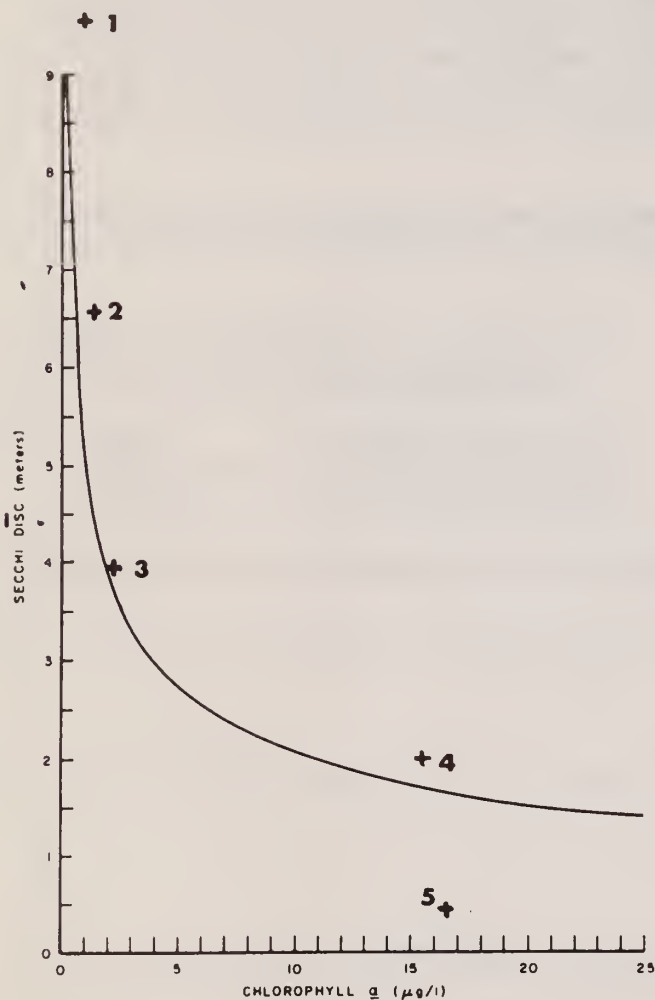
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Twelve Mile Lake.

Date	Stn. S.D.	Main Chloro. <u>a</u>
Aug. 12	4.6	2.1
Aug. 19	4.6	1.8
Sept. 3	6.1	2.4
Mean	<u>5.1</u>	<u>2.1</u>

Insufficient data was collected to allow any meaningful conclusions to be made.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Twelve Mile Lake from 1972 to 1977 and 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972	5.9	1.2
1973	6.3	1.8
1974	6.0	1.0
1975	6.9	2.5
1976	6.5	1.7
1977	6.5	- -
1978	- -	- -
1979	- -	- -



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Twelve Mile Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Twelve Mile Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

If participation in this program is to continue, the sampling frequency must be increased in order to obtain meaningful data.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

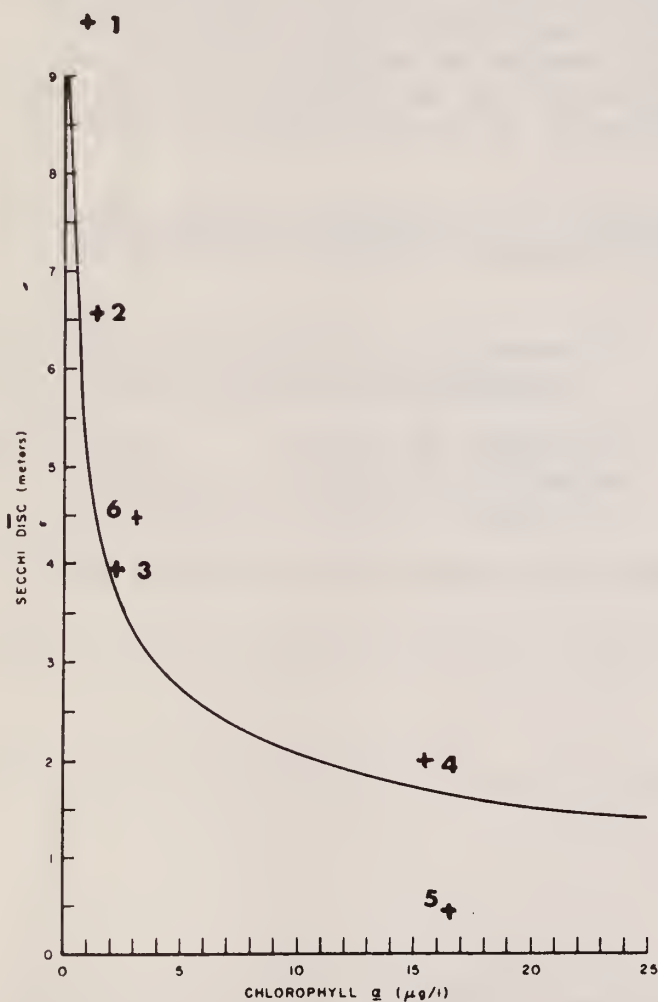
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Walker's Lake.

Date	Stn. S.D.	Main Chloro. <u>a</u>
July 22	5.0	3.0
Aug. 12	4.0	2.6
Aug. 26	2.8	3.3
Sept. 9	6.0	3.3
Mean	<u>4.5</u>	<u>3.1</u>

Since Walker's Lake was sampled on only four occasions in 1979, it is difficult to obtain even a reasonably accurate assesment of the lake's trophic status. Based on the mean of the available data Walker's Lake would be considered moderately enriched, characterized by a moderately high degree of water transparency and moderate densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Walker's Lake from 1974 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
1974	6.4	1.6
1975	5.6	1.6
1976	5.4	2.6
1977	7.2	- -
1978	5.8	1.8
1979	4.5	3.1
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Walker's Lake - 1979.

Figure 1: The relationship between Secchi disc and chlorophyll a for Walker's Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The 1979 data base is insufficient to base any conclusions on, concerning the decrease in the seasonal mean Secchi disc reading and increase in the mean chlorophyll a concentration. If participation in this program is to continue, the sampling frequency must be increased in order that reliable data may be obtained.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

Secchi disc (S.D.) (metres - m)		Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u> ) (micrograms per litre - ug/l)	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

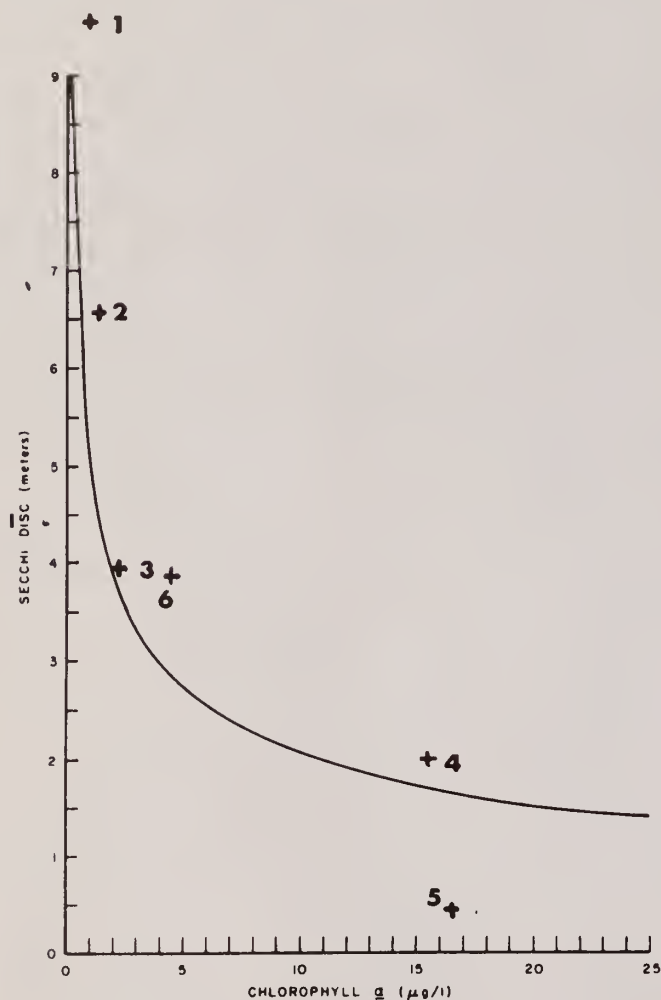
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Waseosa Lake.

Date	Stn. S.D.	Main Chloro. <u>a</u>
July 8	3.5	3.9
July 22	4.0	7.6
Aug. 12	4.0	4.2
Aug. 26	3.5	3.6
Sept. 9	4.0	2.9
Mean	<u>3.8</u>	<u>4.4</u>

The Secchi disc readings remained relatively constant during the sampling period, varying only between 3.5 and 4.0 metres. The chlorophyll a concentrations were more variable, ranging from 2.9 to 7.6 ug/L. The maximum chlorophyll a concentration was measured on July 22nd, following which, concentrations declined during the remainder of the sampling period. Based on the seasonal mean of these two parameters, Waseosa Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and a high densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Waseosa Lake in 1974 and 1977 to 1979.

Year	Stn. S.D.	Main Chloro. <u>a</u>
1971		
1972		
1973		
1974	4.2	2.8
1975	4.1	5.2
1976	- -	- -
1977	5.1	- -
1978	4.8	2.8
1979	3.8	4.4
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Waseosa Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Waseosa Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The available information is insufficient to explain why the lake's transparency decreased and the chlorophyll a concentrations increased in 1979. It is recommended that participation in this program be continued in order to monitor future trends in the quality of Waseosa Lake.

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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

<u>Secchi disc (S.D.)</u> <u>(metres - m)</u>		<u>Chlorophyll <u>a</u> concentrations (Chloro. <u>a</u>)</u> <u>(micrograms per litre - ug/l)</u>	
enriched	0-3 m	high algal densities	4 ug/l or more
moderately enriched	3-5 m	moderate algal densities	2-4 ug/l
unenriched	5 m or more	low algal densities	0-2 ug/l

Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Wenona Lake.

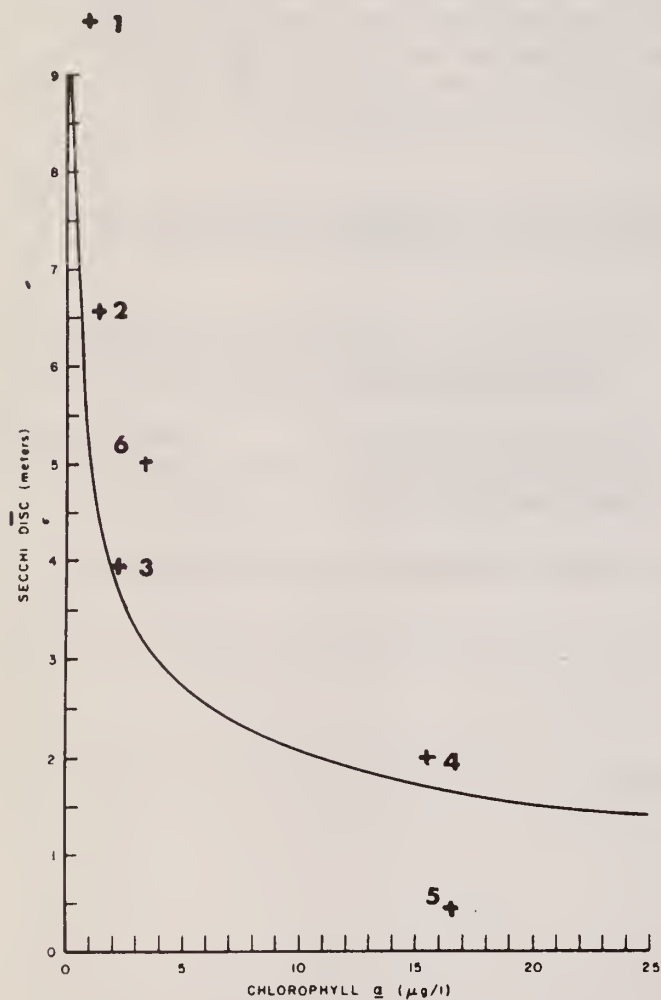
Date	Stn. S.D.	North Bay Chloro. <u>a</u>
June 3	5.0	2.4
June 17	5.25	2.9
June 24	5.75	3.9
July 8	4.5	3.1
July 15	4.5	2.5
July 22	5.0	3.1
July 29	5.5	5.0
Aug. 6	4.75	4.6
Aug. 12	4.5	4.9
Mean	<u>5.0</u>	<u>3.6</u>

The Secchi disc readings remained relatively constant during the period sampled, varying only from 4.5 to 5.75 metres. The chlorophyll a concentrations were more variable, ranging from 2.4 to 5.0 ug/L. Based on the seasonal means of these two parameters, Wenona Lake is characterized by a high degree of water transparency and moderate densities of suspended algae. The transparency of Wenona Lake is greater than normally encountered in Lakes having similar densities of suspended algae. A possible explanation for this is that the algae is concentrated in a narrow layer at a depth greater than the Secchi disc depth, rather than being distributed through the water column as is normal. The algae therefore exert a minimal influence on the degree of water transparency, instead of being a major controlling factor.



Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Wenona Lake in 1979.

Year	Stn.	S.D.	Chloro. <u>a</u>
1971			
1972			
1973			
1974			
1975			
1976			
1977			
1978			
1979		5.0	3.6
"			



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Wenona Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Wenona Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The above graph illustrates the enrichment status of Wenona Lake relative to a number of other Southern Ontario Lakes.

The status of Wenona Lake is approximately mid-way between Twelve Mile Lake, an unenriched lake and Balsam Lake, a moderately enriched water body. Continued participation in this program is recommended in order to determine long trends in the quality of Wenona Lake.

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WOOD LAKE  
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Based on experience, mean annual Secchi disc readings and chlorophyll a concentrations in uncoloured lakes have been grouped into approximate ranges to indicate the status of enrichment.

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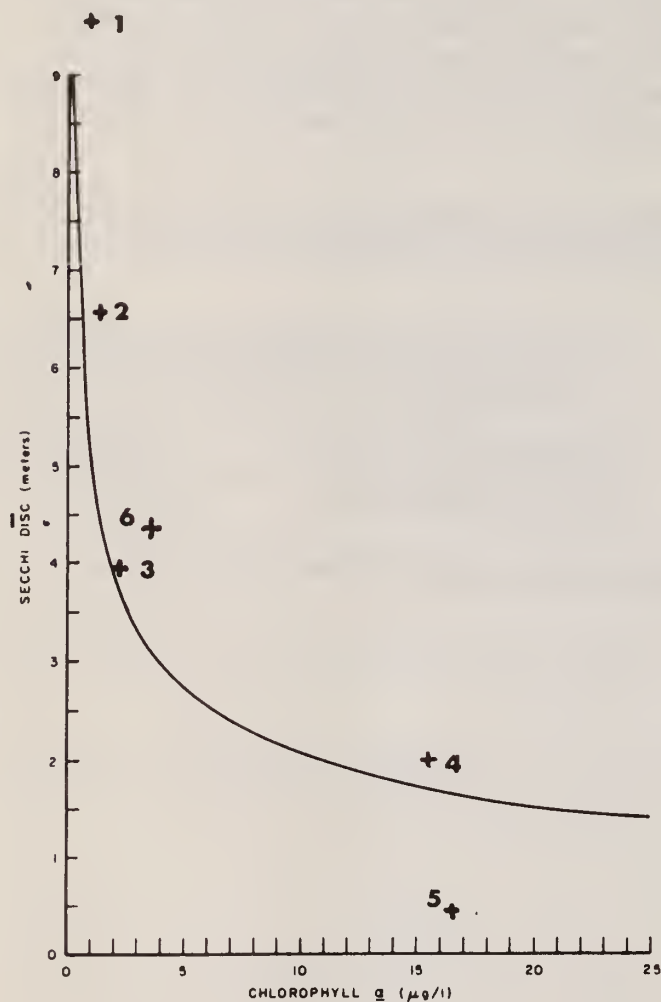
Table 1: Secchi disc (m) and chlorophyll a (ug/l) data collected from Wood Lake.

Date	Stn.	S.D.	Chloro. <u>a</u>
July 31		4.0	5.5
Aug. 6		4.5	2.9
Aug. 19		4.25	5.2
Aug. 26		4.5	3.4
Sept. 2		4.5	2.1
Sept. 9		4.0	2.2
Mean		4.3	3.6

The Secchi disc readings remained almost constant during the period sampled, varying only from 4.0 to 4.5 metres. The chlorophyll a concentrations were more variable, ranging from 2.1 to 5.5 ug/L. The lowest concentrations were measured in September. Based on the seasonal means of these two parameters, Wood Lake would be considered moderately enriched, characterized by a moderate degree of water transparency and moderate densities of suspended algae.

Table 2: Summary of mean values for Secchi disc (m) and chlorophyll a (ug/l) data collected from Wood Lake in 1974, 1975, 1978 and 1979.

	Stn.	
Year	S.D.	Chloro. <u>a</u>
1971		
1972		
1973		
1974	4.5	1.3
1975	4.7	2.9
1976	- -	- -
1977	- -	- -
1978	2.8	3.0
1979	4.3	3.6
"		



1. Kennisis Lake - 1979
2. Twelve Mile Lake - 1976
3. Balsam Lake - 1971
4. MacLean Lake - 1973
5. Lake Scugog - 1972
6. Wood Lake - 1979

Figure 1: The relationship between Secchi disc and chlorophyll a for Wood Lake and a number of other well-known recreational lakes in the province. All data are seasonal means.

The seasonal mean Secchi disc readings and chlorophyll a concentrations have varied considerably from year to year, however there is no evident trend to these variations. Although variable, the overall status of Wood Lake appears stable. Continued participation in this program is recommended, to determine if this trend persists.

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